SPECIAL PROVISIONS

ROUTE 18 EXTENSION SECTION 3A HOES LANE CORRIDOR CONTRACT NO. 045960220 GRADING, PAVING & STRUCTURES TOWNSHIP OF PISCATAWAY, COUNTY OF MIDDLESEX FEDERAL PROJECT NO. NHS-0029(167)

AUTHORIZATION OF CONTRACT

The Contract is authorized by the provisions of Title 27 of the Revised Statutes of New Jersey and supplements thereto, and Title 23 of the United States Code - Highways.

SPECIFICATIONS TO BE USED

The 2007 Standard Specifications for Road and Bridge Construction, of the New Jersey Department of Transportation as amended herein will govern the construction of this Project and the execution of the Contract.

These Special Provisions consist of the following:

Pages 1 to ____ inclusive.

General wage determinations issued under Davis-Bacon and related acts, published by US Department of Labor, may be obtained from the Davis-Bacon web site at http://www.gpo.gov/davisbacon/NJ.html under the appropriate county, select the construction type heading: HIGHWAY.

Pay the prevailing wage rates determined by the United States Secretary of Labor and the New Jersey Department of Labor. If the prevailing wage rate prescribed for any craft by the United States Secretary of Labor is not the same as the prevailing wage rate prescribed for that craft by the New Jersey Department of Labor, pay the higher rate.

State wage rates may be obtained from the New Jersey Department of Labor & Workforce Development (Telephone: 609-292-2259) or by accessing the Department of Labor & Workforce Development's web site at http://lwd.dol.state.nj.us/labor/wagehour/wagehour_index.html The State wage rates in effect at the time of award are part of this Contract, pursuant to Chapter 150, Laws of 1963 (NJSA 34:11-56.25, et seq.).

If an employee of the Contractor or subcontractor has been paid a rate of wages less than the prevailing wage, the Department may suspend the Work, and declare the Contractor in default.

The following FHWA funded project Attachments that are located at the end of these Special Provisions:"

- 1. Required Contract Provisions, Federal-Aid Construction Contracts (Form FHWA-1273).
- 2. Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246).
- 3. Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246).
- 4. State of New Jersey Equal Employment Opportunity for Contracts Funded by FHWA.
- 5. Emerging Small Business Enterprise Utilization Attachment, FHWA Funded Contracts.
- 6. Equal Employment Opportunity Special Provisions.
- 7. Special Contract Provisions for Investigating, Reporting, and Resolving Employment Discrimination and Sexual Harassment Complaints.

DIVISION 100 – GENERAL PROVISIONS

SECTION 101 – GENERAL INFORMATION

101.01 INTRODUCTION

THE FOLLOWING IS ADDED:

Pursuant to NJSA 27:1B-21.6 and USC (United States Code) Section 115, the Department intends to enter into a contract for the advancement of the Project. However, sufficient funds for the Project may not have been appropriated, and only amounts appropriated by law may be expended. Payment under the Contract is restricted to the amounts appropriated for a fiscal year (FY).

Governing bodies have no legal obligation to make such an appropriation. There is no guarantee that additional funds will be appropriated. Failure by governing bodies to appropriate additional funds will not constitute a default under, or a breach of, the Contract. However, if the Department terminates the Contract or suspends work because funds have not been appropriated, the parties to the Contract will retain their rights for suspension and termination as provided in 108.13, 108.14 and 108.15; except as indicated below.

Do not expend or cause to be expended any sum in excess of the amount allocated in the current fiscal year's Capital Program (as specified below). The Department will notify the Contractor when additional funding has been appropriated. Any expenditure by the Contractor which exceeds the amount appropriated is at the Contractor's risk and the Contractor waives its right to recover costs in excess of that appropriated amount.

The approved 2011 Capital Program has an item with \$27.021 million for the construction of the Project.

The Department anticipates that \$17.041 million dollars in additional funds will be provided during State FY 2012.

The Federal FY begins October 1 of the previous calendar year and the State FY begins July 1 of the previous calendar each year.

101.03 TERMS

THE FOLLOWING TERMS ARE CHANGED.

Completion.

(3) IS CHANGED TO:

3. the Contractor has satisfactorily executed and delivered to the RE all documents, including federal form FHWA-47 "Contractor's Statement of Materials and Labor" according to 23CFR 635, certifications, and proofs of compliance required by the Contract Documents, it being understood that the satisfactory execution and delivery of documents, certificates, and proofs of compliance is a requirement of the Contract.

pavement structure. The combination of pavement, base courses, and when specified, a subbase course, placed on a subgrade to support the traffic load and distribute it to the roadbed (see Figure 101-1). These various courses are defined as follows:

- 1. pavement. One or more layers of specified material of designed thickness at the top of the pavement structure.
- base course. One or more layers of specified material of designed thickness placed on the subgrade or subbase.
- **3. subbase.** One or more layers of specified material of designed thickness placed on the subgrade.

101.04 INQUIRIES REGARDING THE PROJECT

1. Before Award of Contract.
THE FIRST PARAGRAPH IS CHANGED TO:

Submit inquiries and/or view other questions/answers by following the format prescribed on the project's electronic bidding web page.

2. After Award of Contract.

Central Region Mr. Kiran Patel, Acting Regional Construction Engineer 100 Daniels Way Freehold, NJ 07728-2668 Telephone: 732-625-4207

SECTION 102 – BIDDING REQUIREMENTS AND CONDITIONS

102.02 BIDDER REGISTRATION AND DOWNLOADING OF THE PROPOSAL DOCUMENTS

THE LAST SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

The Bidder shall not alter or in any way change the software.

102.03 REVISIONS BEFORE SUBMITTING A BID

THE SECOND PARAGRAPH IS CHANGED TO:

The Bidder shall acknowledge all addenda posted through the Department's website. The addenda acknowledgement folder is included in the Department's electronic bidding file. The Department has the right to reject the bid if the Bidder has not acknowledged all addenda posted.

102.04 EXAMINATION OF CONTRACT AND PROJECT LIMITS

1. Evaluation of Subsurface and Surface Conditions.

THE FOLLOWING IS ADDED:

International Roughness Index (IRI) values of the existing roadway					
Route	Mile	e Post	Existing IRI Value		
Route	From	To	Existing 1K1 value		
18	45.2	45.3	128		

This information is the latest available IRI data of the right most through lane from the Pavement Management Unit. The pavement information shown herein was obtained by the Department and is made available to the authorized users only that they may have access to the same information available to the Department. It is presented in good faith, but is not intended as a substitute for investigations, interpretation or judgment of such authorized users.

NEW JERSEY DEPARTMENT OF TRANSPORTATION PAVEMENT CORE RECORD

PROJECT/ROUTE & SECTION: _Route 18 Extension/Section 3A
DRILLER:Stantec Consulting
INSPECTOR:D.R
COUNTY/TOWNSHIP: _Middlesex/Piscataway
DATE STADTED: 12/8/2004 DATE COMDITTED: 12/0/2004

CORE NUMBER	1	2	3	4	5
ROUTE	Hoes Lane	Hoes Lane	Hoes Lane	Morris Avenue	Park Avenue
DIRECTION (N, E, S, W)	NB	SB	West	-	-
MILE POST (MP or Station)	200' North of Buckingham Drive	500' South of Old Hoes Lane	50' from Hoes Lane	50' from Hoes Lane	50' from Hoes Lane
LANE NO. (Left to Right)	2	2	2	2	2
SHOULDER (Inside or Outside)	-	-	-	-	-
CORE DIAMETER (Inches)	6	6	6	6	6
TOTAL CORE DEPTH (Inches)	23.75	20.5	16.75	18.0	26.5
CORE DRILLED TO	Subbase	Subbase	Subbase	Subbase	Subbase
SURFACE TYPE (AC/PC)	AC	AC	AC	AC	AC
AC THICKNESS (Inches)	7.75	8.5	8.25	7.5	6.5
PC THICKNESS (Inches)	-	-	-	-	-

CORE NUMBER	6	7	8	9	10
ROUTE	Hoes Lane	Buena Vista Avenue	Lincoln Avenue	Skiles Avenue	Sydney Road
DIRECTION (N, E, S, W)	NB	-	-	-	-
MILE POST (MP or Station)	100' North of Park Avenue	50' from Hoes Lane	50' from Hoes Lane	50' from Hoes Lane	50' from Hoes Lane
LANE NO. (Left to Right)	1	2	2	2	2
SHOULDER (Inside or Outside)	-	-	-	-	-
CORE DIAMETER (Inches)	6	6	6	6	6
TOTAL CORE DEPTH (Inches)	25.5	23.5	15.25	21.5	17.5
CORE DRILLED TO	Subbase	Subbase	Subbase	Subbase	Subbase
SURFACE TYPE (AC/PC)	AC	AC	AC	AC	AC
AC THICKNESS (Inches)	7.5	5.5	3.25	5.5	9.5
PC THICKNESS (Inches)	-	-	-	-	-

CORE NUMBER	11	12	13	14	15
ROUTE	Hoes Lane	Behmer Road	Old New Brunswick Road	Centennial Avenue	Possumtown Road
DIRECTION (N, E, S, W)	SB	-	-	-	-
MILE POST (MP or Station)	100' South of Telcordia Drive	50' from Hoes Lane	100' from Hoes Lane & Centennial Avenue Intersection	350' West of Hoes Lane or 100' East of Culvert	150' from Centennial Avenue
LANE NO. (Left to Right)	1	2	2	2	2
SHOULDER (Inside or Outside)	-	-	-	-	-
CORE DIAMETER (Inches)	6	6	6	6	6
TOTAL CORE DEPTH (Inches)	22	13.75	19	21.5	20.75
CORE DRILLED TO	Subbase	Subbase	Subbase	Subbase	Subbase
SURFACE TYPE (AC/PC)	AC	AC	AC	AC	AC
AC THICKNESS (Inches)	10	7.75	8.5	6.5	10.75
PC THICKNESS (Inches)	-	-	-	-	-

CORE NUMBER	16		
ROUTE	Knightsbridge Road		
DIRECTION (N, E, S, W)	-		
MILE POST (MP or Station)	300' from Centennial Avenue		
LANE NO. (Left to Right)	2		
SHOULDER (Inside or Outside)	-		
CORE DIAMETER (Inches)	6		
TOTAL CORE DEPTH (Inches)	19.75		
CORE DRILLED TO	Subbase		
SURFACE TYPE (AC/PC)	AC		
AC THICKNESS (Inches)	7.75		
PC THICKNESS (Inches)	-		

^{*} Lane 1 is the left lane in the direction of travel.

The pavement information shown herein was used by the Department for design and estimate purposes.

3. Existing Plans and As-Builts.

Existin	ng Plans and As-builts used are as follows:		
	PROJECT/PLAN NAME	DATE	DESIGNER
a.	Hoes Lane State Aid Project Section 1	Sept. 1, 1070	Piscataway Township
b.	Hoes Lane State Aid Project Section 2	Sept. 6, 1773	Community Design Assoc.
c.	Hoes Lane Section 3	May 9, 1977	Community Design Assoc.
d.	Hoes Lane Section 4	N/A	T&M Assoc.
e.	Reconstruction of Sidney Road	Oct. 1993	Piscataway Township
f.	Centennial Ave. Section 2	July 10, 1964	Charles J. Kupper
g.	Reconstruction of Hoes Lane West	N/A	Piscataway Township
h.	Skiles Ave. Phase 1 and Phase 2	N/A	Piscataway Township
i.	Park Ave. Area Road Improvements	N/A	Piscataway Township
j.	Park Ave. Road Improvements	N/A	Piscataway Township
k.	Morris Ave. Road Reconstruction	N/A	Piscataway Township
1.	Behmer Road Reconstruction	N/A	Piscataway Township
m.	Sidney Road Sanitary Sewer Extension	July 1975	Piscataway Township
n.	Hoes Lane Sanitary Sewer System Sect. 1	July 21, 1967	Piscataway Township
0.	As-built Sanitary Sewer/Drainage Systems	Nov. 1975 & Aug 1978	Casey & Keller
p.	Blue Ridge Farms Sanitary Sewer	N/A	Piscataway Township
•	Blue Ridge Ave. Road Imporovement		•
	Milton Place/Gates Ave. Road Improvemen	nt	
q.	Traffic Signal Plan – Telecordia Access Dr.	. July 6 2000	Schoor Depalma
_	& Knightsbridge Road	•	_
r.	Traffic Signal Plans- Intersections of	Sept. 3, 1976	Community Design Assoc.
	Hoes Lane & Park Ave.; & AT&T Dr.;		
	& Sidney Rd.; & Skiles Ave.		
s.	Traffic Signal Plan – Hoes Lane &	Sept. 4, 1981	William L. Deane, PE
	AT&T Drive/Linpro Ave.		

SECTION 104 – SCOPE OF WORK

104.03.04 Contractual Notice

THE SECOND PARAGRAPH IS CHANGED TO:

Immediately provide written notice to the RE of a circumstance that is believed to be a change to the Contract. If notice is not provided on Contractual Notice (Form DC-161), include the following in the initial written notice:

- 1. A statement that this is a notice of a change.
- 2. The date when the circumstances believed to be a change were discovered.
- 3. A detailed and specific statement describing the nature and circumstances of the change.
- 4. If the change will or could affect costs to the Department.
- 5. If the change will or could affect Contract Time as specified in 108.11.01.C.

In addition to the hard copy of the notice, email the notice to the RE. It is not necessary to attach listed documents to the email.

104.03.09 Delay Damages

- 1. Non-Productive Activity.
 - e. Equipment.

THE FIRST SENTENCE IS CHANGED TO:

If as the result of the delay, equipment cannot be used for any active work, and is directed by the RE to remain on the work site during the delay, the Department will make payment as specified in 104.03.08.7.a.5.

SECTION 105 - CONTROL OF WORK

105.05 WORKING DRAWINGS

THE SECOND PARAGRAPH IS CHANGED TO:

Ensure that working drawing submissions also conform to the Department design manuals and other Department standards for the proposed work. Ensure that working drawings are signed and sealed by a Professional Engineer. After Award, the Department will provide additional formatting information, the number of copies required, and the designated design unit to which the Contractor shall submit working drawings.

THE FOLLOWING ITEMS ARE ADDED INTO TABLE 105.05-1, UNDER THE "CERTIFIED" COLUMN:

DMS Sign Support Structure DMS Standard Ground Mounted

105.07.01 Working in the Vicinity of Utilities

A. Initial Notice.

Water

NJ AMERICAN WATER 120 Raider Rd., P.O. Box 1207 Belle Mead, NJ 08502-1207 Michael Wolan P: (908) 301-3025 Mike.Wolan@amwater.com

<u>Sewer</u>

PISCATAWAY TOWNSHIP SEWER 445 Hoes Lane Piscataway, NJ 08854 Joseph Herrera P: (732) 562-6563 jherrera@piscatawaynj.org

Gas

PUBLIC SERVICE ELECTRIC AND GAS -- GAS 80 Park Plaza, 13A
Newark, NJ 07102
Bill Montague
P: (973) 430-7063
William.Montague@pseg.com

Electric

PUBLIC SERVICE ELECTRIC & GAS -- ELECTRIC 472 Weston Canal Road Somerset, NJ 08873

Aerial

Tom Brekne

P: (732) 764-3223

thomas.brekne@pseg.com

or

Norman Garcia P: (732) 764-3261

Norman.Garcia@pseg.com

Underground

Al Ignacio

P: (732) 764-3167

Alberto.Ignacio@pseg.com

Cable TV

CABLEVISION OF RARITAN VALLEY

275 Centennial Ave. CN 6805

Piscataway, NJ 08856

Mathew Deckman

P:(732) 317-7366

MDeckman@cablevision.com

Telecommunications

VERIZON COMMUNICATIONS

6000 Hadley Rd.

South Plainfield, NJ 07080

Gary Stevenson

P: (732) 214-3909

Gary.s.stevenson@verizon.com

or

Tom Grabowski

P: (732) 418-2620

Thomas.j.grabowski@verizon.com

VERIZON BUSINESS SOLUTIONS (MCI)

1 North Broadway, Suite 710

White Plains, NY 10601

Gary Pasqua

P: (914) 461-2102

Gary.pasqua@verizon business.com

TELEPORT COMMUNICATIONS NEW YORK (AT&T)

175 W. Main Street

Freehold, NJ 07728

Tim Fitzpatrick

P: (908) 670-6925

tfitzpatrick@joemaxtelecom.com

or

Jesse Monchamp

P: (732) 620-4772

jmonchamp@joemaxtelecom.com

ABOVENET 111 8th Avenue, 12th Floor New York, New York 10011 Jerry Gallagher P: (212) 803-5025 or

Keith Franz P: (917) 359-7767 kfranz@above.net

LEVEL 3 COMMUNICATIONS, INC. **Engineering Deparment** 225 Old New Brunswick Road Piscataway, NJ 08854

Elliott Bush P: (732) 371-1627

Elliott.Bush@Level3.com

SUNESYS 202 Titus Avenue Warrington, PA 18976 Chris Mumber P: (267) 927-2034 Cell: (267) 718-0976

CMumber@sunesys.com

4 CONNECTIONS 4 Gatehall Drive Parsippany, NJ 07054 Enzo Clemente P: (908) 239-8678

vclemen1@optimumlightpath.com

RCN METRO OPTICAL NETWORKS (NEON) 2200 West Park Drive Westborough, MA 01581 Steven Lee Cell: (617) 285-9787

Steven.Lee@rcnmetro.com

Petroleum

TEXAS EASTERN PIPELINE 501 Coolidge Street South Plainfield, NJ 07080 Don Hargis P: (908) 757-1212 DCHargis@spectraenergy.com

SUNOCO PIPELINE 525 Fritztown Road Sinking Spring, PA 19608 Ken Latham P: (609) 586-1522

Walt Skorupsky P: (610) 670-3252

whskorupsky@sunocologistics.com

Locating Existing Facilities.

2.

Bureau of Traffic Operations, North Region (TOCN) 670 River Drive Elmwood Park, NJ 07407-1347 Telephone: 201-797-3575

3.

Bureau of Electrical Maintenance, Central Region 100 Daniels Way Freehold, NJ 07728-2668

Telephone: 732-625-4350

C. Protection of Utilities.

THE SECOND PARAGRAPH IS CHANGED TO:

Protect and support existing Department electrical and ITS facilities and ensure that there is no interruption of service. Use hand tools only while working within two feet of the fiber optic network. At least 30 days before beginning the work, submit a plan to the RE for approval showing the method of support and protection.

THE FOURTH PARAGRAPH IS CHANGED TO:

Access within railroad right-of-way is restricted. Before beginning work within the railroad ROW or on railroad facilities, obtain the railroad's written approval for access, the method of construction, and the schedule of the work. Provide a copy of the submittal and approval to the RE. Comply with the railroad's requirements for working within the railroad right-of-way.

THE FOLLOWING IS ADDED TO THE SIXTH PARAGRAPH

Ensure that the work is performed following the railroad's access and safety restrictions.

105.07.02 Work Performed by Utilities

Company Name & Address	Contact Person	Number of Day/s Advance Notice
NJ AMERICAN WATER 120 Raider Rd., P.O. Box 1207	Michael Wolan	2 Days
Belle Mead, NJ 08502-1207		

PUBLIC SERVICE ELECTRIC AND GAS GAS 80 Park Plaza, 13A Newark, NJ 07102	Bill Montague	8 Weeks
PUBLIC SERVICE ELECTRIC & GAS ELECTRIC 472 Weston Canal Road Somerset, NJ 08873	Tom Brekne	16 Weeks to supply material 8 Weeks to begin work
CABLEVISION OF RARITAN VALLEY 275 Centennial Ave. CN 6805 Piscataway, NJ 08856	Mathew Deckman	8 Weeks
VERIZON COMMUNICATIONS 6000 Hadley Rd. South Plainfield, NJ 07080	Gary Stevenson	8 Weeks
VERIZON BUSINESS SOLUTIONS (MCI) 1 North Broadway, Suite 710 White Plains, NY 10601	Gary Pasqua	8 Weeks
TELEPORT COMMUNICATIONS NEW YORK (AT&T) 175 W. Main Street Freehold, NJ 07728	Tim Fitzpatrick	12 Weeks
ABOVENET 111 8th Avenue, 12th Floor New York, New York 10011	Jerry Gallagher	8 Weeks
LEVEL 3 COMMUNICATIONS, INC. Engineering Department 225 Old New Brunswick Road Piscataway, NJ 08854	Elliott Bush	8 Weeks
SUNESYS 202 Titus Avenue Warrington, PA 18976	Chris Mumber	8 Weeks
4 CONNECTIONS 4 Gatehall Drive Parsippany, NJ 07054 Enzo Clemente	Enzo Clemente	8 Weeks

The Contractor is advised that in advance of the start date of this Contract the Department has executed an agreement with PSE&G - Electric to relocate utility poles and aerial electric facilities along the project corridor. Aerial facilities of Verizon Communications, 4Connections, Cablevision, Level 3 Communications, Sunesys, Teleport Communications New York (AT&T) and Verizon Business Solutions (MCI) shall also be relocated to the new utility poles.

A Sunoco Pipeline inspector must be present at the time that any work is done within Sunoco Pipeline's right of way.

Stage # 1

Utility Company Name	Work Description	Work Duration (Day/s)	Restrictions
	Relocate aerial facilities from Rte. 18 (Hoes Lane) NB Sta. 2494+90 to Old New Brunswick Rd. Sta. 29+20.		
4 Connections	Relocate aerial facilities from Rte. 18 (Centennial Ave.) EB Sta. 11+40 RT. To Rte. 18 (Centennial Ave.) SB Sta. 2514+40 RT.		
	Relocate aerial facilities from Existing Knightbridge Sta. 37+20 to Existing Centennial Ave. Sta.16+50 RT.		
	Stage Total	TBD	
Stage # 2 Work Zone A			
Utility Company Name	Work Description	Work Duration (Day/s)	Restrictions
W	Relocate aerial facilities from Rte. 18 (Hoes Lane) NB Sta. 2457+00 RT. to Existing Old New Brunswick Road Sta. 29+10 RT.	40 Days	
Verizon Business Solutions (MCI)	Relocate aerial facilities along Sidney Rd.	40 Days	
		40 D	
	Relocate aerial facilities along Knightsbridge Rd.	40 Days	

Work Zone B

Utility Company Name	Work Description	Work Duration (Day/s)	Restrictions
	Construct 10 feet of ducts & install cables at Rte. 18 (Possumtown Rd.) Sta. 2516+20, RT.	5 Days	
Verizon Communications	Construct 90 feet of ducts & install cables at Exist. Possumtown Rd. Sta. 15+50, RT.	6 Days	
Cablevision	Install 950 feet of fiber optic cable in ducts from Exist. Posssumtown Rd. Sta. 15+35, RT to Rte.18 (Centennial Ave.) Sta. 2518+40, RT.		
Level 3 Communications	Install 950 feet of fiber optic cable in ducts from Exist. Posssumtown Rd. Sta. 15+35 RT to Rte.18 (Centennial Ave.) Sta. 2518+40, RT.	30 Days	
	C4 TF 4 I	TDD	

Stage Total **TBD**

Stage # 3A Work Zone B

Utility Company Name	Work Description	Work Duration (Day/s)	Restrictions
PSE&G - Gas	Perform tie-in and abandonment work for 625 LF of 12-inch gas main relocation	30 Days	No interruption of service between Nov. 1 and Apr. 15
	Construct 15 feet of ducts & install cables at		
	Rte. 18 (Hoes Lane) SB Sta. 2483+10, LT.	5 Days	
Verizon Communications	Support in place 300 feet of existing ducts from Rte. 18 (Hoes Lane) SB Sta. 2489+80 LT to Sta. 2492+70 LT.	20 Days	
Verizon Business Solutions (MCI)	Abandon 830 feet existing ducts. Install 830 feet fiber optic cable in ducts from Rte. 18 (Hoes Lane) SB Sta. 2490+25 LT to Old New Brunswick Rd. Sta. 12+20 LT.	20 Days	
	Stage Total	TBD	

Stage # 4A Work Zone A

Utility Company Name	Work Description	Work Duration (Day/s)	Restrictions
	Install 45 feet fiber optic cable in ducts at Rte.	30 Days	
	18 (Hoes Lane) SB Sta. 2448+75 LT.		
Teleport Communications			
New York (AT&T)	Install 85 feet fiber optic cable in ducts at Rte.	30 Days	
	18 (Hoes Lane) SB Sta. 2454+00 LT.		
Level 3 Communications	Install 85 feet fiber optic cable in ducts at Rte.	20 Davis	
	18 (Hoes Lane) SB Sta. 2454+00 LT.	30 Days	
Verizon Communications	Construct 85 feet of ducts & install cables at		
	Rte. 18 (Hoes Lane) SB Sta. 2454+00 LT.		
PSE&G - Electric	Install 700 feet primary cable in ducts from Rte.		
	18 (Hoes Lane) SB Sta. 2453+25 LT. to Sta.		
	2460+40 LT.		
Verizon Business Solutions	Install 60 feet fiber optic cable in ducts at Rte.	Combined	
(MCI)	18 (Hoes Lane) SB Sta. 2464+00 LT.	w/aerial: 40 Days	
Cablevision	Install 60 feet fiber optic cable in ducts at Rte.		
	18 (Hoes Lane) SB Sta. 2464+00 LT.		

Stage Total TBD

SECTION 106 - CONTROL OF MATERIAL

106.03 FOREIGN MATERIALS

THE FOLLOWING IS ADDED AFTER THE FIRST PARAGRAPH:

For steel and iron products incorporated into the Project, provide a certification from the manufacturer stating the country where the steel or iron product was melted and manufactured including application of coatings which protect or enhance the value of the material. Ensure that 4 copies of the manufacturer's certification are provided with each delivery of steel and iron products. Retain 1 copy and submit 3 copies to the RE. Ensure that the certification includes, materials description, quantity of material represented by the certification, country of manufacture, and notarized signature of a person having legal authority to bind the supplier. If a Certification of Compliance as specified in 106.07 contains a statement regarding the country of manufacture, a separate certification is not necessary.

106.04 MATERIALS QUESTIONNAIRE

THE LAST SENTENCE OF THE FIRST PARAGRAPH IS REPLACED BY THE FOLLOWING:

For ITS systems as specified in Section 704, obtain approval of system working drawings including individual components and Electrical material instead of submitting a materials questionnaire.

SECTION 107 - LEGAL RELATIONS

107.04 NEW JERSEY CONTRACTUAL LIABILITY ACT

THE FOURTH PARAGRAPH IS CHANGED TO:

For purposes of determining the date of "completion of the contract" pursuant to N.J.S.A. 59:13-5, "completion of the contract" occurs on the date that the Contractor provides written notice to the Department of Acceptance or conditional Acceptance of the Proposed Final Certificate or the 30th day after the Department issues the Proposed Final Certificate, whichever event occurs first.

107.09 INDEPENDENT CONTRACTOR

THE SECOND SENTENCE IS CHANGED TO:

It shall neither hold itself out as, nor claim to be, an officer or employee of the Department by reason hereof.

107.12 THE CONTRACTUAL CLAIM RESOLUTION PROCESS

107.12.01 Satisfying the Notice Requirements

THE FOLLOWING IS ADDED TO THE SECOND PARAGRAPH:

Upon request, provide the RE with 3 copies of all documentation submitted in support of the claim.

107.12.02 Steps

3. Step III, Claims Committee.

THE SECOND PARAGRAPH IS CHANGED TO:

The Claims Committee will not review a claim or combination of claims valued less than \$250,000 until after the receipt of conditional release as specified in 109.11. If the Contract is 75 percent complete or greater as measured by Contract Time or Total Adjusted Contract Price, the Claims Committee will not review a claim or combination of claims valued more than \$250,000 until after receipt of conditional release as specified in 109.11. If the Claims Committee does not review a claim or combination of claims before Completion, the Claims Committee will review the claim or combination of claims at a single session of the Claims Committee after the receipt of the conditional release as specified in 109.11 and all claims have been reviewed at Steps I and II of the Claims Resolution Process. When reviewing a combination of claims, the Claims Committee will not review any individual claim valued less than \$20,000.

SECTION 108 – PROSECUTION AND COMPLETION

108.01 SUBCONTRACTING

1. Values and Quantities.

THE FOLLOWING IS ADDED TO FIRST PARAGRAPH

1.

Specialty Items are as listed below: Drilled Shafts. Water Mains

Above ground highway lighting items.

Electrical wire items.

ITS items, except for foundations, standards, and junction boxes.

Fiber Optic communication cable system items.

THE THIRD PARAGRAPH IS CHANGED TO:

If a partial quantity of work for a unit price Item is subcontracted, the Department will determine the value of the work subcontracted by multiplying the price of the Item by the quantity of units to be performed by the subcontractor.

THE FOURTH PARAGRAPH IS CHANGED TO:

If only a portion of work of an Item is subcontracted, the Department will determine the value of work subcontracted based on the value of the work subcontracted as indicated in the subcontract agreement and as shown in a breakdown of cost submitted by the Contractor.

108.02 COMMENCEMENT OF WORK

THE SUBPART 4 IN THE FIRST PARAGRAPH IS CHANGED TO:

4. Progress schedule as specified in 153.03

108.06 NIGHT OPERATIONS

2. Visibility Requirements for Workers and Equipment.

THE FIRST PARAGRAPH IS CHANGED TO:

Ensure that workers wear a 360° high-visibility retroreflective safety garment meeting ANSI/ISEA Class 3, Level 2 standards.

108.08 LANE OCCUPANCY CHARGES

THE SECOND PARAGRAPH IS CHANGED TO:

The RE will keep record of each occurrence as well as the cumulative amount of time that a lane is kept closed beyond the lane closure schedule and provide the record to the Contractor. The Department will calculate the lane occupancy charge by multiplying the length of time of the delayed opening, in minutes, by the rate of \$10 per minute per lane, unless otherwise specified in the Special Provisions. The total amount per day for the lane occupancy charge that the Department will collect will not exceed \$10,000.00.

THE FOLLOWING IS ADDED:

The rate to calculate the Lane Occupancy Charge is as follows:

DescriptionRateOverrun of "One Lane Maintained" AM Time Limit\$30/minuteOverrun of "One Lane Maintained" PM Time Limit\$10/minute

108.09 MAINTENANCE WITHIN THE PROJECT LIMITS

THE FOLLOWING IS ADDED TO THE FIRST PARAGRAPH:

6. Access to ITS devices and their respective controllers and meter cabinets is maintained throughout the duration of the project.

108.10 CONTRACT TIME

- A. Complete all work required for Substantial Completion on or before September 25, 2013.
- B. Achieve Completion on or before November 28, 2013.

108.11.01 Extensions to Contract Time

B. Types of Delays.

1. Non-Excusable Delays.

THE FOLLOWING IS ADDED:

For work performed by Utilities, delays up to 30 percent of the estimated duration specified in 105.07.02 are considered non-excusable. The duration includes both the advance notice and the completion of the work by the Utility.

For delays caused by Railroads, delays up to 30 percent of the estimated availability specified in 105.07 are considered non-excusable.

2. Excusable, Non-Compensable Delays.

b. Utilities.

THE FOLLOWING IS ADDED:

For delays caused by Railroads, when the availability to access is reduced by more than 30 percent greater than the estimated availability specified in 105.07.

108.19 COMPLETION AND ACCEPTANCE

THE FOLLOWING IS ADDED:

No Incentive Payment for Early Completion is specified for this project.

108.20 LIQUIDATED DAMAGES

Liquidated damages are as follows:

- B. For each day that the Contractor fails to complete the work as specified in Subpart B of Subsection 108.10 of these Special Provisions, for Substantial Completion, the Department will assess liquidated damages in the amount of \$3,800/day.
- C. For each day that the Contractor fails to achieve Completion as specified in Subpart C of Subsection 108.10 of these Special Provisions, the Department will assess liquidated damages in the amount of \$3,800/day.

THE FOLLOWING IS ADDED:

When the Contractor may be subjected to more than one rate of liquidated damages established in this Section, the Department will assess liquidated damages at the higher rate.

THE FOLLOWING NEW SUBSECTION IS ADDED:

108.22 WORK RESTRICTIONS

No construction equipment shall have access to the Ambrose Brook. In addition, no work shall be performed in the Ambrose Brook that creates a turbidity condition, especially during the fish spawning period of April 1 – June 30.

No lane closures will be permitted on Fridays and Saturdays during Rutgers home football games.

No lane closures will be permitted on the following holidays:

Easter Sunday Memorial Day July 4 Labor Day Election Day (6:00 AM until 8:00 PM the day of) Thanksgiving Day Christmas Day New Years Day

The Township of Piscataway Police Department, Traffic Section (732-562-2345) shall be notified a minimum of 72 hours prior to any lane closures and 1 week prior to any ramp closures.

No water main work shall be performed between April 1 and September 30.

No gas main work shall be performed between October 1 and April 1.

SECTION 109 - MEASUREMENT AND PAYMENT

109.01 MEASUREMENT OF QUANTITIES

THE SECOND PARAGRAPH IS CHANGED TO:

The Department will designate Items as Measured Items or as Proposal Items by having a suffix of M or P in the Item number respectively. The Department will measure quantities of Measured Items for payment.

109.02 SCOPE OF PAYMENT

THE THIRD SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

The Department will not make additional or separate payment for work or portion of work unless specifically provided for in the "Measurement and Payment" Subsection.

109.07 BONDS POSTED IN LIEU OF RETAINAGES

THE FIRST PARAGRAPH IS CHANGED TO:

The Contractor may deposit negotiable bonds of the State or any of its political subdivisions, which have been approved by the Department, in an escrow account to secure release of all or a portion of the retainage withheld as specified in 109.05. Establish the account under the provisions of an escrow agreement to be entered into between the Contractor, the Department, and a bank located in the State that is an authorized depository with a trust department. Pay the charges of the bank for services rendered according to the terms and conditions of the escrow agreement.

DIVISION 150 – CONTRACT REQUIREMENTS

SECTION 152 – INSURANCE

152.03.01 Owner's and Contractor's Protective Liability Insurance

A. Policy Requirements.

THE FOURTH SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

Ensure that policies are underwritten by companies with a current A.M. Best rating of A- with a Financial Size Category of VII or better.

B. Types

3. Owner's and Contractor's Protective Liability Insurance.

THE ENTIRE TEXT IS CHANGED TO:

Procure a separate Owner's and Contractor's Protective Liability Insurance Policy with a minimum limit of liability in the amount of \$4,000,000 per occurrence as a combined single limit for bodily injury and property damage. Ensure the policy is endorsed to include Severability of Interest/Separation of Insureds clause. Ensure the policy names the State, its officers, employees, and agents as additional insured. Provide documentation from the insurance company that indicates the cost of the Owner's and Contractor's Protective Liability Insurance Policy.

Ensure the policy is endorsed to include per project aggregate.

6. Marine Liability Insurance.

SUBPART 8 IS ADDED:

8. Per project aggregate.

152.03.02 Railroad Protective Liability Insurance

THE FOLLOWING IS ADDED TO THE FIRST PARAGRAPH:

Ensure the policy is endorsed to include per project aggregate.

152.03.03 Pollution Liability Insurance

SUBPART 9 IS ADDED: TO THIRD PARAGRAPH

9. Per project aggregate.

152.04 MEASUREMENT AND PAYMENT

THE LAST PARAGRAPH IS CHANGED TO:

The Department will make initial payment for OWNER'S AND CONTRACTOR'S PROTECTIVE LIABILITY INSURANCE, RAILROAD PROTECTIVE LIABILITY INSURANCE, and POLLUTION LIABILITY INSURANCE at the lesser of the bid amount, or actual costs as documented from paid invoices. If the Bid amount is greater than the amount indicated on the documented paid invoices, the Department will make payment for any remainder, up to the Bid amount, with the final monthly Estimate.

SECTION 153 – PROGRESS SCHEDULE

153.03.01 CPM Progress Schedule

THE THIRD PARAGRAPH IS CHANGED TO:

The Contractor may propose alternate staging. Ensure that proposed alternate staging does not interfere with work done by Others without written concurrence from the affected Others. The Department may reject the proposed alternate staging if it causes an increase to the cost of work done by Others. The Contractor is responsible for the cost of changes or additional work required as a result of completing the work according to the proposed alternate staging.

1. Preliminary Schedule Submission.

THE SECOND PARAGRAPH IS CHANGED TO:

The RE may require 3 color paper copies of the preliminary schedule, Gantt Chart, as specified in 153.03.02.2.e, and a network diagram (PERT) printed on 36×22 -inch plans detailing the activity relationships.

2. Baseline Schedule Submission.

THE LAST SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

The RE may require the Contractor to submit 3 color paper copies of the baseline schedule.

THE SECOND PARAGRAPH PART 3 IS CHANGED TO:

3. The RE may require 3 color paper copies of the tabular reports, as specified in 153.03.02.2, and a printed network diagram (PERT) on 36×22 -inch sheets detailing the activity relationships.

153.03.02 CPM Progress Schedule Updates

THE LAST PARAGRAPH IS CHANGED TO:

If the project falls behind schedule for nonexcusable delays, so that the schedule indicates that the Work will not be completed by the Completion date, as specified in 108.10, take the necessary steps to improve progress. Under such circumstances, the RE may direct the Contractor to increase the number of shifts, begin overtime operations, work extra days including weekends and holidays, and supplement its construction plant. Furthermore, the RE may require the Contractor to submit for approval a recovery schedule showing how the Contractor proposes to meet the directed acceleration.

2. Tabular Reports.

THE FIRST SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

The RE may require 3 color paper copies of the longest path sort, total float sort, responsibility sort, area sort, and Gantt chart

153.04 MEASUREMENT AND PAYMENT

THE THIRD PARAGRAPH IS CHANGED TO:

If the Contractor's CPM Progress Schedule update is not approved by the date of the progress meeting for the following update, the Department will assess liquidated damages to recover the Department's increased administrative costs. The Department will assess damages for each delinquent update as follows:

SECTION 155 - CONSTRUCTION FIELD OFFICE

155.03.01 Field Office

- 4. Communication Equipment.
 - **a. Telephones.** Provide _4_ cordless phones with auto-switching.

- c. Cell Phones. Provide _7_ cellular phones. Ensure the cellular phone plan provides for unlimited mobile to mobile in-network usage, unlimited push-to-talk/ walkie-talkie usage and an anticipated monthly usage of 900 any-time minutes for each phone. Ensure the phones are on the same plan. Ensure the cellular phone plan has a home rate with no roaming charges within the state. Ensure each cellular phone has the following features:
 - 1. Push to Talk / Walkie-Talkie capable
 - 2. Camera with 1 megapixel picture capability
 - 3. Battery life capable of 180 minutes of continuous use and 72 hours of standby use
 - 4. Equipped with a hands-free headset
 - 5. Base charger and car charger
- **d.** Computer System. Provide a computer system meeting the following requirements:
 - _4_ computer configurations each meeting the following:
 - Equipped with an Intel Pentium _IV_ processor with Hyper Threading technology having a clock speed of _3.5_ GHz or faster, _4_ GB RAM, _512_ MB Video RAM, _200_ Gigabyte hard drive designated as drive C, one DVD (+/-) Writer Drive, one CD-R Recordable Drive. Ensure the system is USB 2.0 compatible and has at least two front USB ports Include Keyboard, optical mouse and 2 piece desktop speakers.
 - 2. Wired Router with appropriate number of ports and cables and a print server. Ensure there is at least one wired Ethernet switch.
 - 3. High-speed broad band connection and service with a minimum speed of _3_ Megabits per second (mbps) with dynamic IP address for the duration of the project.
 - 4. 19 inch or larger Flat Screen LCD monitor with tilt/swivel capabilities.
 - _250_ Megabyte or larger Zip Drive internal or external with backup software for MS-Windows and DOS, and fifteen corresponding formatted data cartridges corresponding to the tape drive size.
 - 6. _1_ Flatbed USB version 2.0 or greater Color Scanner with automatic document feed.
 - 7. Uninterruptible power supply (UPS).
 - 8. Surge protector for the entire computer configuration to be used in conjunction with the UPS.
 - 9. Computer workstation, chair, printer stand, and/or table having both appropriate surface and chair height.
 - One can of compressed air and screen cleaning solution every other month of the duration of the contract.

Ensure one computer has a 56K baud data/fax modem. If more than one computer configuration is specified, provide one network interface card for the base computer configuration and hardwire connections between computer configurations as directed by the RE.

Also provide:

- _10_ USB _8_ GB Flash/Jump memory drives
- _100_ CD-R _700_ MB (or larger) recordable CD's compatible with the CD drive and _100_ recordable DVD's.
- _4_ CD/DVD Holder (each holds 50)
- 1 color laser printers and supplies as follows:
 - 1. HP PCL 6 emulation, with a minimum of 192 Megabytes of expanded memory, printer cable, and legal size paper tray.
 - 2. One set of printer ink cartridges every other month for the duration of the construction project for each printer.

Software as follows:

- 1. Microsoft Windows, latest version with future upgrades for the duration of the entire project. Ensure 1 computer has a Microsoft Windows XP 32 Bit Operating System for ACES, Extra and Groupwise.
- 2. Microsoft Office Professional, latest version.
- 3. Norton's System Works for Windows, latest version, or compatible software package with future upgrades and latest virus patches.
- 4. Anti-Virus software, latest version with monthly updates for the duration of the contract.
- 5. Visio Professional Graphics Software for Windows, latest version
- 6. Primavera Project Management, latest version
- 7. Adobe Acrobat Professional, latest version, for Scanner

THE THIRD PARAGRAPH IS CHANGED TO:

When the computer system is no longer required by the RE, the Department will remove and destroy the hard drive, and return the computer system to the Contractor. The Department will retain other data storage media.

6. Office Equipment.

- 2. _1_ digital camera(s). Ensure each digital camera has auto-focus, with rechargeable batteries and charger, _256_ MB memory card, USB Memory Card Reader compatible with camera and field office computer, 1.5 inch LCD monitor, _5_ mega pixel resolution, _10_ X optical zoom lens, built in flash, image stabilization, computer connections, and a carrying case
- 3. _1_ video camcorder(s). Ensure each video camcorder is a mini DVD camcorder with _10_ optical zoom, 2" LCD monitor, USB 2.0 compatible and includes USB 2.0 connections.

7. Inspection Equipment.

- 1. 2 Calculators with trigonometric capability
- 2. _1_ Date/ Received stamp and ink pad
- 3. _1_ Electronic Smart level, 4 foot
- 4. _1_ Electronic Smart level, 2 foot
- 5. _8_ Carpenter rulers
- 6. _3_ Steel tape, 100 feet
- 7. _3_ Cloth tape, 100 feet
- 8. 1 Illuminated measuring wheel
- 9. _1_ Plumb bob and cord
- 10. _1_ Line level and cord
- 11. _2_ Surface thermometer
- 12. 2 Concrete thermometer
- 13. _2_ Digital infrared asphalt thermometer
- 14. _1_ Direct Tension Indicator (DTI) Feeler Gage, 0.005 inch
- 15. _1_ Sledge hammer, 8lb
- 16. _1_ Self leveling laser level with range of 100 feet and an accuracy of 1/4 inch per 100 feet
- 17. _8_ Hard hats orange, reflectorized hard hats according to ANSI Z89.1
- 18. _8_ Safety garments orange, reflectorized, 360° high visibility safety garments according to ANSI/ISEA Class 3, Level 2 standards. To be replaced yearly for the duration of the contract.
- 19. _8_ Sets of rain gear with reflective sheeting
- 20. _8_ Sets of hearing protection with a Noise Reduction Rating of 22 dB
- 21. _8_ Sets of eye protection according to ANSI Z87.1
- 22. _5_ Sets of fall arrest equipment according to ANSI Z359.1 standards consisting of a full body harness, lanyard and anchor
- 23. _1_ Light meter capable of measuring the level of luminance in foot-candles
- 24. _6_ Lantern flashlight, 6V with monthly battery replacements
- 25. _1_ Digital Psychrometer
- 26. _1_ Chain Drag according to ASTM D4580-86

- 27. _1_ Testing equipment and apparatus conforming to AASHTO T23, T119, T152
- 28. _6_ Hard Bound Daily Diaries, 5-1/2" X 8" minimum with one day per page. To be provided yearly for the duration of the contract.
- 29. 600 Legal size hanging folders
- 30. _600_ Legal size manila file folders three tab

155.03.03 Telephone Service

THIS SUBPART IS CHANGED TO:

Telephone service consists of monthly charges for telephone and cellular phones provided for the field office and materials field laboratory excluding set up charges.

155.04 MEASUREMENT AND PAYMENT

THE THIRD PARAGRAPH IS CHANGED TO:

The Department will make payment for TELEPHONE SERVICE for the actual costs of the charges as evidenced by paid bills submitted within 60 days of receipt from the service provider for telephone and cell phones.

SECTION 156 – MATERIALS FIELD LABORATORY AND CURING FACILITY

156.03 PROCEDURE

156.03.01 Materials Field Laboratory

- **Communication Equipment.**
 - Cell Phones. Provide 3 cellular phones. Ensure the cellular phone plan provides for unlimited mobile to mobile in-network usage, unlimited push-to-talk/ walkie-talkie usage and an anticipated monthly usage of 900 any-time minutes for each phone. Ensure the phones are on the same plan. Ensure the cellular phone plan has a home rate with no roaming charges within the state. Ensure each cellular phone has the following features:
 - Push to Talk / Walkie-Talkie capable
 - Camera with 1 megapixel picture capability

computer configurations each meeting the following:

- Battery life capable of 180 minutes of continuous use and 72 hours of standby use 3.
- Equipped with a hands-free headset 4.
- Base charger and car charger
- **Computer System.** Provide a computer system meeting the following requirements: d.

Equipped with an Intel Pentium ___ processor with Hyper Threading technology having a clock speed of ___ GHz or faster, ___ GB RAM, ___ MB Video RAM, ___ Gigabyte hard drive designated as drive C, one DVD (+/-) Writer Drive, one CD-R Recordable Drive. Ensure the system is USB 2.0 compatible and has at least two front USB ports.

- Wireless Ethernet Hub Switch with appropriate number of ports and cables and a print server.
- High-speed broad band connection and service with a minimum speed of Megabytes per second (mbps) with dynamic IP address for the duration of the project.
- 19 inch or larger Flat Screen LCD monitor with tilt/swivel capabilities. 4.
- ____ Megabyte or larger Zip Drive internal or external with backup software for MS-Windows and DOS, and fifteen corresponding formatted data cartridges corresponding to the tape drive
- 6. Flatbed USB version 2.0 Color Scanner with automatic document feed.
- Uninterruptible power supply (UPS). 7.
- Surge protector for the entire computer configuration to be used in conjunction with the UPS. 8.

- 9. ___ computer workstations, chair, printer stand, and/or table having both appropriate surface and chair height.
- 10. One can of compressed air and screen cleaning solution every other month of the duration of the contract.

Ensure one computer has a 56K baud data/fax modem. If more than one computer configuration is specified, provide one wireless network card for the base computer configuration and hardwire connections between computer configurations as directed by the RE.

Also provide:
USB GB Flash/Jump memory drives
CD-R MB (or larger) recordable CD's compatible with the CD drive and recordable
DVD's.
CD/DVD Holder (each holds 50)
color laser printers and supplies as follows:

- 1. HP PCL 5 emulation, with a minimum of 192 Megabytes of expanded memory, printer cable, and legal size paper tray.
- One set of printer ink cartridges every other month for the duration of the construction project for each printer.

THE THIRD PARAGRAPH IS CHANGED TO:

When the computer system is no longer required by the ME, the Department will remove and destroy the hard drive, and return the computer system to the Contractor. The Department will retain other data storage media.

156.03.05 Nuclear Density Gauge

THE LAST PARAGRAPH IS CHANGED TO:

Provide a nuclear density gauge for the exclusive use of the ME using one of the following methods:

- 1. Purchase a nuclear density gauge under the Contractor's New Jersey Department of Environmental Protection (NJDEP) License or the Contractors United States Nuclear Regulatory Commission (USNRC) license.
- 2. Lease a nuclear density gauge from a New Jersey Department of Environmental Protection (NJDEP) or United States Nuclear Regulatory Commission (USNRC) licensed third party on the Department's New Jersey Department of Environmental Protection (NJDEP) License.

The Contractor is barred from purchasing gauges on the Department's New Jersey Department of Environmental Protection (NJDEP) license. Perform calibration and servicing of the gauge, other than routine wipe tests, every 24 months. The ME may direct additional calibrations, when necessary. Supply a replacement gauge for the Department's use during the calibration and servicing period.

SECTION 157 – CONSTRUCTION LAYOUT AND MONUMENTS

157.03.01 Construction Layout

THE SEVENTH PARAGRAPH IS CHANGED TO:

Provide the Utilities with the layout needed to install relocated utility facilities and coordinate the Work. Ensure that relocated facilities do not conflict with proposed construction, including High Voltage Proximity Act conflicts. THE FOLLOWING IS ADDED AFTER THE NINTH PARAGRAPH:

For each bridge and sign structure within the Project Limits, provide the RE as-built measurements of the vertical under clearance at each lane line, shoulder line, curb line and edge of pavement line under a structure to the nearest inch. For each bridge structure, provide vertical under clearance measurements at each fascia beam.

SECTION 158 – SOIL EROSION AND SEDIMENT CONTROL AND WATER QUALITY CONTROL

158.03.02 SESC Measures

19. Oil-Only Emergency Spill Kit.

THE SECOND SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

Include Oil-only Emergency Spill Kit, Type 1 consisting of the following:

SECTION 159 - TRAFFIC CONTROL

159.02.02 Equipment

THE FOLLOWING IS ADDED TO THE LIST OF EQUIPMENT REFERENCES:

159.03.02 Traffic Control Devices

2. Construction Barrier Curb.

THE LAST PARAGRAPH IS CHANGED TO:

Provide top and side mounted flexible delineators on the construction barrier curb. For delineators located on the right side when facing in the direction of traffic, ensure that the retroreflective sheeting is white. For delineators located on the left side when facing in the direction of traffic, ensure that the retroreflective sheeting is yellow. Attach flexible delineators according to the manufacturer's recommendations.

Starting at the beginning of the construction barrier curb section mount top delineators at 100-foot intervals on tangent sections, curves of radii greater than 1,910 feet, and at 50-foot intervals on curves of radii of 1,910 feet or less.

Mount side delineators at the lead end of each barrier segment with the top of the delineator 3 inches from the top of the barrier.

6. Traffic Control Truck with Mounted Crash Cushions.

THE LAST SENTENCE IS CHANGED TO:

Submit drawings to the RE detailing the manner of securing the ballast, signed and sealed by a Professional Engineer, certifying that it is capable of withstanding the impact forces for which the impact attenuator is rated.

THE FOLLOWING IS ADDED TO THE SECOND PARAGRAPH:

8. Portable Trailer Mounted CCTV Camera Assembly (PTMCCA). Place the PTMCCA at the minimum of 2 locations directed by the RE. Ensure that a designated representative familiar with the operation and programming of the unit is available on the Project for initial installation. If the PTMCCA fails to function, repair the equipment within 48 hours of receiving notice from the Department that the PTMCCA is not functioning.

Provide a system that includes a robotic network camera remotely controllable, including Pan, Tilt and Zoom (PTZ), and viewable over the internet through a password protected website. Provide for internet access through the website hosted by EarthCam for Department cameras. No substitution is permitted. Provide broadband communication service and On-Site Camera Configuration for remote operation and control from the web site to the field site. Provide continuous viewable image at a minimum of 320H x 240V resolution and 1 frame per sec (fps) through the web site. If required by the Traffic Operation Center (TOC) specified in 105.07.01.B, establish password level designations, camera presets, and camera image displays. Provide all incidental equipment or material required for successful remote operation and communications.

Provide for one week of testing by the TOC for remotely operating the PTMCCA before the start of construction operations that require lane or shoulder closures, or other impacts to traffic.

159.03.08 Traffic Direction

A. Flagger.

THE LAST SENTENCE IS CHANGED TO:

Ensure that the flagger is equipped with a STOP/SLOW paddle and follows MUTCD flagging procedures.

159.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEMS ARE ADDED:

Item
PORTABLE TRAILER MOUNTED CCTV CAMERA ASSEMBLY

Pay Unit

THE FOLLOWING IS ADDED

If after being notified by the Department that the PORTABLE TRAILER MOUNTED CCTV CAMERA ASSEMBLY has failed to function and the equipment has not been restored to good working order within 48 hours, the Department will make payment reductions as follows:

For each occasion the equipment was not restored within 48 hours the Department will assess a liquidated damage of \$250 for every 48 hours period the equipment is not functioning.

SECTION 160 – PRICE ADJUSTMENTS

160.03.01 Fuel Price Adjustment

THROUGHOUT THIS SUBPART, TABLE 161.03.01-1 IS CHANGED TO TABLE 160.03.01-1

THE THIRD PARAGRAPH IS CHANGED TO:

If the as-built quantity of an Item listed in Table 160.03.01-1 differs from the sum of the quantities in the monthly Estimates, and the as-built quantity cannot be readily distributed among the months that the Item listed in Table 160.03.01-1 was constructed, then the Department will determine fuel price adjustment by distributing the difference in the same proportion as the Item's monthly Estimate quantity is to the total of the Item's monthly estimates.

THE 25 TH LINE IN THE TABLE 160.03.01-1 IS CHANGED TO:

HOT MIX ASPHALT	_ BASE COURSE	2.50 Gallons per Ton		

THE FOLLOWING ARE ADDED TO TABLE 160.03.01-1

Items	Fuel Usage Factor
NON-VEGETATIVE SURFACE, HOT MIX ASPHALT	2.50 Gallons per Ton
COLOR-COATED NON-VEGETATIVE SURFACE, HOT MIX ASPHALT	2.50 Gallons per Ton

160.03.02 Asphalt Price Adjustment

NOTE 1 OF THE THIRD PARAGRAPH IS CHANGED TO:

1. The Department will determine the weight of asphalt binder for price adjustment by multiplying the percentage of new asphalt binder in the approved job mix formula by the weight of the item containing asphalt binder. If a Hot Mix Asphalt item has a payment unit other than ton, the Department will apply an appropriate conversion factor to determine the number of tons used.

THE FOURTH PARAGRAPH IS CHANGED TO:

 $A = B \times [(MA - BA)/BA] \times C \times M \times G$

Where:

A = Asphalt Price Adjustment

B = Bid Price for Tack Coat/Prime Coat

MA = Monthly Asphalt Price Index

BA = Basic Asphalt Price Index C = Petroleum Content of the Tack Coat and Prime Coat in Percent by Volume:

Use 100% for cutbacks and Tack Coat 64-22

60% for Polymer Modified Tack Coat

60% for RS or similar type emulsions
M = Percentage of Bid Price Applicable to Materials Only: Use 82%

G = Gallons of Tack Coat and Prime Coat Furnished and Applied

DIVISION 200 – EARTHWORK

SECTION 201 – CLEARING SITE

201.03 CONSTRUCTION

201.03.01 Clearing Site

THE FOLLOWING IS ADDED TO THIS SUBPART:

Remove fences and guide rail as required. Where required by construction operations or as directed by the RE, backfill the post holes and compact the area to the elevation of the adjacent ground surface.

201.03.02 Clearing Site, Bridge and Clearing Site, Structure

THE FOLLOWING IS ADDED TO THE FIRST PARAGRAPH.

Only the following equipment is permitted for the work:

1. Pneumatic or Electric Equivalent Hand Operated Hammers.

- a. When demolishing concrete not closer than 6 inches to structural members: hammers weighing no more than 90 lbs (exclusive of bit), equipped only with chisel point bits.
- b. When demolishing concrete within 6 inches of structural members: hammers weighing no more than 30 lbs (exclusive of bit).

2. Saw Cutters.

- a. When cutting concrete within 6 inches of structural members: concrete cutters and concrete saws. While using water in the cutting operation, provide shielding beneath the cutting operation to prevent water leakage. Continuously collect slurry and dispose of as specified in 201.03.09. Ensure that the slurry does not enter the structure or highway drainage system.
- **3. Hydraulic Breakers.** Ram-hoe type breakers, hydraulic breakers, and demolition shears may be used with the following restrictions:
 - a. Submit required data to the RE for Department's analysis of stresses induced to the girders.
 - b. Delineate the centerline and limits of the top flange of girders before the equipment operation.
 - c. Do not use equipment within 6 inches of the delineated flanges.
 - d. Do not pull or twist the reinforcement steel.
- 4. Hydraulic Splitters. Hydraulic splitters.
- 5. Other Equipment. Obtain RE approval before use.

THE FOLLOWING IS ADDED:

The procedure is described below:

 Prestressed Concrete Stringers and Concrete Diaphragms. Repair damage to prestressed concrete stringers and concrete diaphragms using nonshrink grout conforming to Subsection 903.08 before deck placement.

THE FOLLOWING IS ADDED:

CLEARING SITE, BRIDGE (HOES LANE OVER AMBROSE BROOK):

The Contract Drawings show Demolition and Removal Plans. These plans show the limits and types of structural elements that must be removed. Submit a comprehensive Demolition Plan showing the methods, equipment, and sequencing that will be used to remove the existing structure. Coordinate removal operations with the Traffic Control Plans and any utility work. Remove portions of the existing in two stages of construction.

Coordinate demolition operations of the Southbound Structure with Verizon. Do not damage the existing conduits in the sidewalks that will be relocated onto the final Southbound Structure. Verizon will temporarily support the existing conduits during construction.

Remove the following:

Southbound Structure (Stage 3B Construction – Work Zone B):

- Remove the existing superstructure
- Remove a portion of the substructure units as indicated

Northbound Structure (Stage 3C Construction – Work Zone B):

- Remove the existing median parapet and walkway as indicated
- Remove a portion of the existing deck slab as indicated
- Remove a portion of the existing backwall as indicated

201.03.03 Temporary Shielding

THE FOLLOWING IS ADDED:

For Behmer Road and Morris Avenue prefabricated steel truss bridges, provide temporary shielding to protect live traffic if the concrete deck is placed after erection of the truss. If the concrete deck is placed before the erection of the truss, temporary shielding will not be required for deck placement, and the Department will not make payment for the Temporary Shielding contract item.

201.03.04 Removing Underground Storage Tanks

THE THIRD PARAGRAPH, SUBPART 2, LAST PARAGRAPH IS CHANGED TO:

Before backfilling, remove and dispose of contaminated water not associated with ground water. If directed, immediately backfill the excavated hole as required per N.J.A.C. 7:26E and obtain documentation for the quality of the fill. In addition, provide certification stating that it is virgin material from a commercial or noncommercial source or decontaminated recycled soil. Backfill the excavation as specified in 201.03.07.5 but use certified clean fill as noted above.

201.03.05 Monitoring Wells

THE FOLLOWING IS ADDED TO THIS SUBPART:

Seal monitoring wells according to 201.03.06. The general locations of existing monitoring wells are provided in the Plans and are noted below:

MW-2 Route 18 SB (Hoes Lane) Sta. 2485+33 187' Left

MW-5 Hoes Lane West Sta. 68+81 77' Left

201.03.08 Asbestos Removal

THIS SUBPART IS CHANGED TO:

Refer to Attachment E – Absestos Removal for asbestos removal requirements.

201.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEM IS ADDED:

THE FOLLOWING IS ADDED:

The Department will not make payment for the Item CLEARING SITE in excess of \$325,000 until Completion.

The Department will not make payment for the item CLEARING SITE, BRIDGE (HOES LANE OVER AMBROSE BROOK) in excess \$60,000 until Substantial Completion.

SECTION 202 – EXCAVATION

202.01 DESCRIPTION

THE FOLLOWING IS ADDED TO THIS SECTION:

This Section also describes the requirements for scarification of subsoil in areas of compacted soils prior to topsoiling, fertilizing and seeding and/or planting.

202.02 MATERIALS

THE FIRST IN THE LIST IS CHANGED TO:

202.03 CONSTRUCTION

202.03.04 Excavating Regulated Material

3. Temporarily Storing.

THE FIRST PARAGRAPH IS CHANGED TO:

Temporarily store regulated or hazardous material in stockpiles within the Project Limits and as shown on the Plans. Construct stockpiles on polyethylene sheeting. Contain stockpiles with haybales or silt fence placed continuously at the perimeter of the stockpiles. For hazardous material, if a stockpile area is not available within the Project Limits, sample and analyze materials in-situ for disposal. Excavate and place the hazardous regulated material directly into trucks, and haul it directly to the approved disposal facility.

THE FOLLOWING IS ADDED TO THIS SECTION:

202.03.10 Subsoil Scarification

- A. Paved Areas. Prior to performing subsoil scarification remove and dispose of pavement, including base course, in accordance with Subsection 202.03.06. Scarify and cultivate to an average depth of 18 inches, incorporating the existing subbase with the existing subsoil. Repeat operation until the subbase and subsoil are evenly mixed. Smooth to grade prior to topsoiling, fertilizing and seeding and/or planting. Use wide track or wide tire equipment to minimize compaction of mixed soil.
- **B.** Vegetated Areas. Remove all stumps, brush, weeds, and debris from the surface area to be subsoil scarified and dispose of in accordance with Subsection 201.03.09. Scarify the subsoil to an average depth of 18 inches, with parallel rows spaced 24 inches on center. Smooth to grade prior to topsoiling, fertilizing and seeding and/or planting. Use wide track or wide tire equipment to minimize compaction of mixed soil.

Repair any damage to vegetation, pavement surfaces, structures, utilities or other property at no cost to the State.

202.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEM IS ADDED:

Item
SUBSOIL SCARIFICATION

Pay Unit SQUARE YARD

SECTION 203 – EMBANKMENT

203.01 DESCRIPTION

THE FOLLOWING IS ADDED TO THIS SECTION:

This Section also describes the requirements for installation of geotextile for pavement subgrade stabilization and separation. All applicable provisions of AASHTO Standard Specification for Geotextile Specification for Highway Applications (AASHTO M 288-05) for Separation/Stabilization Geotextiles apply unless modified in this section or in the contract drawings.

This Section also describes the requirements for furnishing and installation of a geosynthetic clay liner (GCL) for stormwater detention basin lining with cover material at the indicated locations.

203.02 MATERIALS

203.02.01 Materials

THIS SUBPART IS CHANGED TO:

Provide materials as specified:

The geotextile shall meet the requirements of Table 5 (Stabilization Geotextile Property Requirements) of AASHTO M 288-05.

THE FOLLOWING IS ADDED TO THIS SUBPART:

Geosynthetic Clay Liner

- A. GCL Provide a manufactured, prefabricated, three layered product consisting of the following:
 - 1. Sodium Bentonite That meets the following:
 - a. Swell Index of 24 mL / 2 g minimum in accordance with ASTM D 5890.
 - b. Fluid Loss of 18 mL maximum in accordance with ASTM D 5891.
 - c. Granular and continuously adhered throughout the liner and to the support fabrics so that no displacement of bentonite occurs when the liner is cut, punctured, or torn.
 - d. Bentonite Content of 0.75 lbs./sq. ft minimum in accordance with ASTM D 5993.
 - e. Permeability of 5 x 10⁻⁹ cm/second maximum in accordance with ASTM D 5084.
 - 2. Primary Backing. Non-biodegradable, non-toxic, porous, woven, geotextile that meets the following:
 - a. 3.1 oz. per square yard minimum in accordance with ASTM D 5261.
 - 3. Secondary Backing. Non-woven geotextile, for protecting and containing the granular bentonite during installation that meets the following:
 - a. 6.0 oz. per square yard meter minimum in accordance with ASTM D 5261.
 - 4. Bentonite/geotextile composite in rolls having a minimum width of 4.0 meters (13 feet).
 - a. Tensile Grab Strength 90 pounds minimum in accordance with ASTM D 4632.
 - 5. Supply Geosynthetic Clay Liner in rolls marked and tagged with the following information:
 - a. Manufacturer's Name
 - b. Product Identification
 - c. Lot Number
 - d. Roll Number
 - e. Roll Dimension
 - f. Roll Weight
 - 6. Provide to the Department from the fabricator, prior to installation of the bentonite liner, a certification (with product identification, lot number, and roll number) signed by an authorized employee of the manufacturer indicating that the GCL material meets the required specifications.
 - B. Soil Cover as shown in the basin details.

203.03 CONSTRUCTION

THE FOLLOWING IS ADDED TO THIS SECTION:

203.03.03 Geotextile, Roadway Stabilization

Submit working drawings for geotextile in accordance with Section 105.

Install geotextile according to Section A3 of AASHTO M 288-05. The subgrade shall be inspected for areas of soft, loose, or unsuitable material that cannot be sufficiently compacted. Such areas shall be overexcavated by 24 inches and replaced with AASHTO No. 57 stone underlain by geotextile as shown in the contract drawings.

203.03.04 Geosynthetic Clay Liner

Install in basins with 12 inches depth minimum cover over all lined areas, as indicated including overlaps at field seams and anchor trenches. Submit a proposed GCL placement method for approval by the RE. Use a core pipe and spreader bar to handle the GCL roll.

Store bentonite liners (i.e., GCL) in their original, unopened wrapping in a dry area. Protect from precipitation and the direct heat of the sun, especially when stored for a long period of time. Store the materials above the ground surface and beneath a roof or other protective covering. Keep the bentonite liner clean and free from debris prior to installation.

Provide a smooth subgrade, removing protrusions and rocks larger than 2 inches. If rock is encountered at the bottom of excavation, overexcavate 6 inches minimum and place embankment soil (i.e., Soil Aggregate I-14) over exposed rock prior to placing liner. Do not begin liner installation until a proper base has been prepared to accept the bentonite liner. Complete anchor trench excavation before liner installation begins. Lock the leading edge of the GCL into the anchor trench as indicated. Uniformly compact subgrade to the line and grade as indicated. Do not allow construction equipment to operate directly on the liner without the support of an adequate depth of backfill as indicated.

Complete all excavation as indicated prior to GCL placement. Place the GCL over the prepared surface in a manner to assure minimum handling and in accordance with the manufacturer's recommendations. Place GCL with the woven side down. Install GCL so that all seams on slopes are perpendicular to the bottom of the excavation i.e., toe of the slope. Ensure GCL placed is covered the same day. Do not place GCL in standing water or during rain. Minimize dragging the GCL on the ground and smooth out creases or irregularities during placement. Do not allow the GCL to be stretched to fit the profile.

Follow manufacturer's instructions for installation, seaming and patching around inlet risers and any other penetrations.

When placing adjacent panels of GCL ensure that longitudinal (side) seams are overlapped a minimum of 12 inches and that end-of-panel seams are overlapped a minimum of 24 inches. Remove all soil from the overlap area of the GCL and place a bead of granulated bentonite clay between the layers as directed by the manufacturer. Cover irregular shapes, cuts, or tears in installed GCL with sufficient material to provide 12 inches of overlap on all adjacent sides as directed. Place a bead of granular bentonite around the damaged area. Place a bead of construction adhesive around the perimeter of the bottom of the repair patch to secure the patch in place prior to placing the cover material.

Place the cover fill material over the GCL immediately after placement, as indicated. Ensure a minimum thickness of 12 inches of cover soil is maintained between equipment tires/tracks and the GCL at all times during cover placement. Push soil cover up slopes, not down slopes to minimize tensile forces on the GCL. Place cover soil in a manner that prevents the soil from entering the GCL overlap zones. Compact soil with a minimum of two complete passes of equipment tracks over the entire area.

203.04 MEASUREMENT AND PAYMENT THE FOLLOWING ITEMS ARE ADDED:

Item
GEOTEXTILE, ROADWAY STABILIZATION
GEOSYNTHETIC CLAY LINER

Pay Unit SQUARE YARD SQUARE YARD

DIVISION 400 – PAVEMENTS

SECTION 401 – HOT MIX ASPHALT (HMA) COURSES

401.01 DESCRIPTION

THE FOLLOWING IS ADDED TO THIS SECTION:

This Section also describes the requirements for installation of paving fabric between pavement layers. The function of the paving fabric is to act as a waterproofing and stress relieving membrane within the pavement structure. All applicable provisions of AASHTO Standard Specification for Geotextile Specification for Highway Applications (AASHTO M 288-05) for Paving Fabric apply unless modified in this section or in the contract drawings.

401.02 MATERIALS

401.02.01 Materials

THE FOLLOWING IS ADDED TO THIS SECTION:

The paving fabric shall meet the requirements of Table 8 (Paving Fabric Property Requirement) of AASHTO M 288-05.

EMULSIFIED ASPHALT UNDER TACK COAT IS REVISED TO:

401.02.02 Equipment

THE LAST PARAGRAPH IS CHANGED TO:

When an MTV is used, install a paver hopper insert with a minimum capacity of 14 tons in the hopper of the HMA paver.

401.03 CONSTRUCTION

401.03.01 Preparing Existing Pavement

A. Milling of HMA.

Stage	Max. time interval allowed
All stages	72 Hours

THE FOLLOWING IS ADDED AFTER THE FOURTH PARAGRAPH:

Sawcut at the limit of paving in driveways and at other limits requiring a neat edge between new and existing HMA.

D. Repairing HMA Pavement.

THE ENTIRE TEXT IS CHANGED TO:

If potholes are discovered, notify the RE immediately. The RE may immediately direct repairs of small areas. The RE may require further evaluation of a large area to determine the need for additional milling and paving.

Sawcut existing HMA pavement to a maximum depth of 10 inches, or to the full depth of bound layers, whichever is less. Sawcut lines parallel and perpendicular to the roadway baseline and 3 inches away, at the closest point, from the damaged area to be repaired.

Remove damaged and loose material to a depth of at least 3 and no more than 10 inches below the level of milling within the boundary of the sawcuts to form rectangular openings with vertical sides. Shape and compact the underlying surface to produce a firm, level base. Ensure that the remaining pavement is not damaged.

Apply polymerized joint adhesive or tack coat to the vertical surfaces of the openings. Spread and grade HMA in the opening as directed by the RE. Ensure that the temperature of the HMA when placed is at least 250 °F, and

compact as specified in 401.03.03.F. Compact areas not accessible to rollers with a flat face compactor. Compact until the top of the patch is flush with the adjacent pavement surface.

Reuse removed material as specified in 202.03.07.A.

401.03.02 Tack Coat and Prime Coat

TABLE 401.03.02-1 IS CHANGED TO:

Table 401.03.02-1 Tack Coat Application			
Material	Spraying Temp, °F	Gallons per Square Yard	Season
Cut-Back Asphalt:			
RC-70	120 to 190	0.05 to 0.15	Oct 15 to Apr 15
Emulsified Asphalt:			
RS-1	70 to 140	0.05 to 0.15	All year
CRS-1	125 to 185	0.05 to 0.15	All year
SS-1, SS-1h	70 to 140	0.05 to 0.15	All year
CSS-1, CSS-1h	70 to 140	0.05 to 0.15	All year

TABLE 401.03.02-2 IS CHANGED TO:

Table 401.03.02-2 Prime Coat Application			
Cut-Back Asphalt	Spraying Temp, °F	Gallons per Square Yard	Season
MC-30	85 to 150	0.1 to 0.5	Oct 15 to Apr 15
MC-70	120 to 190	0.1 to 0.5	Oct 15 to Apr 15
Emulsified Asphalt:			
CSS-1	70 to 140	0.1 to 0.50	All year

401.03.03 HMA Courses

D. Transportation and Delivery of HMA.

THE FIRST PARAGRAPH IS CHANGED TO:

Deliver HMA using HMA trucks in sufficient quantities and at such intervals to allow continuous placement of the material. Do not allow trucks to leave the plant within 1 hour of sunset unless nighttime lighting is provided as specified in 108.06. The RE will reject HMA if the HMA trucks do not meet the requirements specified in 1009.02. The RE will suspend construction operations if the Contractor fails to maintain a continuous paving operation. Before the truck leaves the plant, obtain a weigh ticket from a fully automatic scale. Before unloading, submit for each truckload a legible weigh ticket that includes the following:

- 1. Name and location of the HMA plant.
- 2. Project title.
- 3. Load time and date.
- 4. Truck number.
- 5. Mix designation.
- 6. Plant lot number.
- 7. Tare, gross, and net weight.

E. Spreading and Grading.

THE THIRD PARAGRAPH IS CHANGED TO:

Use an MTV for the construction of surface course in the traveled way. Ensure that the MTV independently delivers HMA from the HMA trucks to the HMA paver. Operate the MTV to ensure that the axle loading does not damage structures, roadway, or other infrastructure.

H. Air Void Requirements.

THE FOLLOWING IS ADDED AFTER THE THIRD PARAGAPH:

If areas of existing shoulders are found to be insufficient to support the proposed HMA pavement and the required compaction cannot be achieved, notify the RE immediately. The RE may either direct additional milling and paving to provide a suitable base to pave the proposed HMA or waive coring and air void requirements in such shoulder areas.

J. Ride Quality Requirements.

THE FIRST PARAGRAPH IS CHANGED TO:

The Department will evaluate the HMA surface course using the International Roughness Index (IRI) according to ASTM E 1926. The Department will use the measured IRI to compute the appropriate pay adjustment (PA). The PA may be positive for superior quality work or negative for defective work. The Department may exclude certain area as specified in the Special Provisions.

SUBPART 3 OF SECOND PARAGRAPH IS CHANGED TO:

- 3. Preparation for IRI Testing. Provide the necessary traffic control when the Department performs IRI testing. Perform required mechanical sweeping of the surface course before IRI testing. To facilitate auto triggering on laser profilers, place a single line of preformed traffic marking tape perpendicular to the roadway baseline 300 feet before the beginning of each lane, shoulder, and ramp to be tested. Submit the actual stationing for each traffic marking tape location to the RE.
- 4. Acceptance.
 - a. Pay Adjustment.

THE FOLLOWING IS ADDED:

Route	Туре	Number of Lift		Mile Post	
Koute	Туре	Number of Lift	From	To	
18	Highways other than Freeways	1	45.3	47.9	

THE FOLLOWING IS ADDED TO THIS SECTION:

401.03.06 Geotextile, Paving Fabric

Submit working drawings for geotextile in accordance with Section 105.

Materials, equipment, and installation shall be in accordance with Section A6 of AASHTO M 288-05 and contract drawings.

401.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEM IS ADDED:

Item
GEOTEXTILE, PAVING FABRIC

Pay Unit SQUARE YARD

THE FOLLOWING IS ADDED:

The Department will make a payment adjustment for HMA air void quality by the following formula:

Pay Adjustment = $Q \times BP \times PPA$

Where:
BP = Bid Price
Q= Air Void Lot Quantity
PPA= air void PPA as specified in 401.03.03H.

The Department will make a payment adjustment for HMA thickness quality by the following formula:

Pay Adjustment = $Q \times BP \times PPA$

Where:

BP = Bid Price

Q= Thickness Lot Quantity

PPA= thickness PPA as specified in 401.03.03I

The Department will make a payment adjustment for HMA ride quality, as specified in 401.03.03J.

SECTION 402 – HMA FRICTION COURSE

402.04 MEASUREMENT AND PAYMENT

THE FOLLOWING IS ADDED:

The Department will make payment for TACK COAT 64-22 as specified in 401.04.

The Department will make a payment adjustment for HMA thickness quality by the following formula:

Pay Adjustment = $Q \times BP \times PPA$

Where:

BP = Bid Price

Q= Thickness Lot Quantity

PPA= thickness PPA as specified in 401.03.03I

The Department will make a payment adjustment for HMA ride quality, as specified in 401.03.03J.

SECTION 403 – ULTRA-THIN FRICTION COURSE

403.03.01 Ultra-Thin Friction Course

E. Spreading and Grading.

THE SECOND PARAGRAPH IS CHANGED TO:

Apply polymer modified tack at a temperature of 140 to 175 °F. Continuously monitor rate of spray, ensuring a uniform application rate over entire width to be overlaid. Apply at the rate of 0.20 ± 0.05 gallons per square yard. Do not allow traffic, equipment, tools, or any other disturbance to the polymer modified tack coat before placing the ultra-thin friction course.

403.04 MEASUREMENT AND PAYMENT

THE FOLLOWING IS ADDED:

The Department will make a payment adjustment for HMA thickness quality, by the following formula:

Pay Adjustment = $Q \times BP \times PPA$

Where:

BP = Bid Price

Q= Thickness Lot Quantity

PPA= thickness PPA as specified in 401.03.03I

The Department will make a payment adjustment for HMA ride quality, as specified in 401.03.03J.

SECTION 404 – STONE MATRIX ASPHALT (SMA)

404.03.01 SMA

H. Air Void Requirements.

THIS PART IS CHANGED TO:

Drill cores as specified in 401.03.05.

Mainline lots are defined as the area covered by a day's paving production of the same job mixed formula between 1000 and 4000 tons for the traveled way and auxiliary lanes. The RE will combine daily production areas less than 1000 tons with previous or subsequent production areas to meet the minimum lot requirements. When the maximum lot requirement is exceeded in a day's production, the RE will divide the area of HMA placed into 2 lots with approximately equal areas.

Ramp pavement lots are defined as approximately 10,000 square yards of pavement in ramps. The RE may combine ramps with less than the minimum area into a single lot. If 2 or more ramps are included in a single lot, the RE will require additional cores to ensure that at least 1 core is taken from each ramp.

Other pavement lots are defined as approximately 10,000 square yards of pavement in shoulders and other undefined areas.

The ME will calculate the percent defective (PD) as the percentage of the lot outside the acceptable range of 2 percent air voids to 7 percent air voids. The acceptable quality limit is 10 percent defective. For lots in which PD < 10, the Department will award a positive pay adjustment. For lots in which PD > 10, the Department will assess a negative pay adjustment.

The ME will determine air voids from 5 cores taken from each lot in random locations. The ME will determine air voids of cores from the values for the maximum specific gravity of the mix and the bulk specific gravity of the core. The ME will determine the maximum specific gravity of the mix according to NJDOT B-3 and AASHTO T 209, except that minimum sample size may be waived in order to use a 6-inch diameter core sample. The ME will determine the bulk specific gravity of the compacted mixture by testing each core according to AASHTO T 331.

The ME will calculate pay adjustments based on the following:

1. Sample Mean (\overline{X}) and Standard Deviation (S) of the N Test Results $(X_1, X_2, ..., X_N)$.

$$\overline{X} = \frac{\left(X_1 + X_2 + \dots + X_N\right)}{N}$$

$$S = \sqrt{\frac{(X_1 - \overline{X})^2 + (X_2 - \overline{X})^2 + \dots + (X_N - \overline{X})^2}{N - 1}}$$

2. Quality Index (Q).

$$Q_L = \frac{\left(\overline{X} - 2.0\right)}{S}$$

$$Q_U = \frac{\left(7.0 - \overline{X}\right)}{S}$$

- 3. **Percent Defective (PD).** Using NJDOT ST for the appropriate sample size, the Department will determine PD_L and PD_U associated with Q_L and Q_U , respectively. $PD = PD_L + PD_U$
- **4. Percent Pay Adjustment (PPA).** Calculate the PPA for traveled way and ramp lots as specified in Table 401.03.03-3.

Table 401.03.01-1 PPA for Mainline Lots and Ramp Lots		
	Quality	PPA
	PD < 10	PPA = 4 - (0.4 PD)
Surface	$10 \le PD < 30$	PPA = 1 - (0.1 PD)
	PD ≥ 30	PPA = 40 - (1.4 PD)
I4	PD < 30	PPA = 1 - (0.1 PD)
Intermediate and Base	PD ≥ 30	PPA = 40 - (1.4 PD)

Calculate the PPA for other pavement lots as specified in Table 401.03.03-4.

Table 401.03.01-2 PPA for Other Pavement Lots		
	Quality	PPA
All Commen	PD < 50	PPA = 1 - (0.1 PD)
All Courses	PD ≥ 50	PPA = 92 - (1.92 PD)

- **5. Outlier Detection.** The ME will screen all acceptance cores for outliers using a statistically valid procedure. If an outlier is detected, replace that core by taking an additional core at the same offset and within 5 feet of the original station. The following procedure applies only for a sample size of 5.
 - 1. The ME will arrange the 5 core results in ascending order, in which X_1 represents the smallest value and X_5 represents the largest value.
 - 2. If X_5 is suspected of being an outlier, the ME will calculate:

$$R = \frac{X_5 - X_4}{X_5 - X_1}$$

3. If X_1 is suspected of being an outlier, the ME will calculate:

$$R = \frac{X_2 - X_1}{X_5 - X_1}$$

- 4. If R > 0.642, the value is judged to be statistically significant and the core is excluded.
- 6. Retest. If the initial series of 5 cores produces a percent defective value of PD ≥ 30 for mainline or ramp lots, or PD ≥ 50 for other pavement lots, the Contractor may elect to take an additional set of 5 cores at random locations chosen by the ME. Take the additional cores within 15 days of receipt of the initial core results. If the additional cores are not taken within the 15 days, the ME will use the initial core results to determine the PPA. If the additional cores are taken, the ME will recalculate the PPA using the combined results from the 10 cores.
- 7. **Removal and Replacement.** If the final lot $PD \ge 75$ (based on the combined set of 10 cores or 5 cores if the Contractor does not take additional cores), remove and replace the lot and all overlying work. The replacement work is subject to the same requirements as the initial work.

404.04 MEASUREMENT AND PAYMENT

THE FOLLOWING IS ADDED:

The Department will make a payment adjustment for HMA air void quality by the following formula:

Pay Adjustment = $Q \times BP \times PPA$

Where:

BP = Bid Price

Q= Air Void Lot Quantity

PPA= air void PPA as specified in 401.03.03H.

The Department will make a payment adjustment for HMA thickness quality by the following formula:

Pay Adjustment = $Q \times BP \times PPA$

Where:
BP = Bid Price
Q= Thickness Lot Quantity
PPA= thickness PPA as specified in 401.03.03I

The Department will make a payment adjustment for HMA ride quality, as specified in 401.03.03J

SECTION 405 – CONCRETE SURFACE COURSE

405.03.02 Concrete Surface Course

I. Thickness Requirements.

THIS PART IS CHANGED TO:

I. Thickness Requirements. The ME will divide the concrete pavement into lots of approximately 5000 square yards. The ME will divide each lot into 5 equal sections. The RE will direct the Contractor to drill 1 core, as specified in 405.03.03, from a randomly selected location within each section. The ME will test these cores for thickness as specified in ASTM C 174.

The Department will determine conformance with thickness requirements as follows and will either assess the greater of the pay reduction for average core thickness or individual core thickness, or the Department will direct the Contractor to remove and replace the lot:

1. Average Core Thickness. If the average core thickness is greater than or equal to the specified core thickness, the Department will not apply a payment reduction. If the average thickness is less than the specified thickness, but is greater than or equal to the specified thickness minus 1/2 inch, the Department will determine payment reduction by the following formula:

Payment Reduction = $Q \times BP \times PPR$

Where:

Q = Thickness Lot Quantity

BP = Bid Price

 T_S = Specified Thickness.

 T_A = Average Thickness

PPR = Percent Payment Reduction =
$$\frac{T_S - T_A}{T_S}$$

- 2. Individual Core Thickness. When more than 2 individual cores in the lot are less than the specified thickness minus 1/4 inch, the Department will determine the payment reduction using for the above noted formula and using a PPR = 2 percent.
- 3. **Remove and Replace.** If the average thickness is less than the specified thickness minus 1/2 inch, the RE will require that the lot be removed and replaced.

405.04 MEASUREMENT AND PAYMENT

THE FOLLOWING IS ADDED:

The Department will make a payment adjustment for Concrete Surface thickness quality, as specified in 405.03.02.

The Department will make a payment adjustment for HMA ride quality, as specified in 401.03.03J

DIVISION 450 – CONCRETE PAVEMENT REHABILITATION

SECTION 453 – FULL DEPTH CONCRETE PAVEMENT REPAIR

453.03.01 Full Depth Repair Using Concrete

C. Setting Forms, Joint Ties, and Dowels. THE THIRD SENTENCE OF THE SEVENTH PARAGRAPH IS CHANGED TO:

Slowly withdraw the tube as the hole is filled.

DIVISION 500 – BRIDGES AND STRUCTURES

SECTION 502 – LOAD BEARING PILES

502.03.03 Driving Piles

B. Methods of Driving.

THE FOLLOWING IS ADDED TO THE LAST PARAGRAPH:

4. Cast-In-Place Piles. Ensure that reinforcement steel is installed as specified in 504.03.01. Place concrete as specified in 504.03.02. Clean out open end piles to the elevation shown on Plans. Weld closure plates for closed-end pipe piles as shown on Plans.

SECTION 503 – DRILLED SHAFT FOUNDATIONS

503.03.04 Crosshole Sonic Logging (CSL)

A. CSL Tube Installation.

THE THIRD PARAGRAPH IS CHANGED TO:

Ensure that each pipe is fitted with a watertight shoe at the bottom and a removable cap at the top. Attach the pipes securely to the interior of the reinforcement cage with a minimum cover of 4 inches. Install the tubes as near to parallel as possible.

503.03.06 Constructing Drilled Shafts

- F. Constructing Using Casings.
 - 2. Removable Casing.

THE LAST SENTENCE OF THE SECOND PARAGRAPH IS CHANGED TO:

Do not expose the shaft concrete to salt water or moving water for 7 days.

SECTION 504 – STRUCTURAL CONCRETE

504.03.02 Constructing Concrete

THE FOLLOWING IS ADDED FOR STRUCTURE NO. 1237-172 – ROUTE 18 (HOES LANE) OVER AMBROSE BROOK BRIDGE, STRUCTURE NO. 1237-171 – PEDESTRIAN BRIDGE OVER ROUTE 18 AT BEHMER ROAD, AND STRUCTURE NO. 1237-170 – PEDESTRIAN BRIDGE OVER ROUTE 18 AT MORRIS AVENUE:

Where over-excavation is specified under the proposed footings, the excavation shall be backfilled with Class B Concrete and payment will be included in the standard item "Concrete Footing", unless otherwise noted.

THE FOLLOWING IS ADDED FOR STRUCTURE NO. 1237-172 – ROUTE 18 (HOES LANE) OVER AMBROSE BROOK BRIDGE:

The existing 48" reinforced concrete storm pipe at Wing A is to remain in place and be maintained at all times. Construct Wing A around the existing pipe. Alternate construction methods may be proposed at no additional cost to the Department.

The existing manhole near Wing A is to remain. Reset the top of manhole to accommodate the new grade as required (Roadway Item).

SECTION 505 – PRECAST AND PRESTRESSED STRUCTURAL CONCRETE

505.01 DESCRIPTION

THE FOLLOWING IS ADDED:

This Section describes the requirements for manufacturing, furnishing, and erecting precast prestressed concrete deck panels HPC, and concrete steps precast concrete. Also refer to the contract drawings for additional requirements.

505.02.01 MATERIALS

THE FOLLOWING IS ADDED:

505.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEMS ARE ADDED:

Item
CONCRETE STEPS, PRECAST CONCRETE
PRESTRESSED CONCRETE DECK PANELS, HPC

Pay Unit LINEAR FOOT SQUARE FOOT

The Department will measure the length of Concrete Steps, Precast Concrete along the horizontal projection of the centerline of each installed precast unit, from the edge of the unit at the top; to the nose of the step, or the edge of the unit at the bottom.

The Department will measure the area of Prestressed Concrete Deck Panels, HPC as the product of the full width of the panel, and the full length of the centerline of the panel at the top of the panel.

SECTION 506 - STRUCTURAL STEEL

506.01 DESCRIPTION

THE FOLLOWING IS ADDED:

This Section also describes the requirements for furnishing and installing light pole support brackets at Behmer Road and Morris Avenue pedestrian bridges.

506.03.01 Structural Steel

E. Installing High-Strength Steel Bolts.

THE SECOND PARAGRAPH IS CHANGED TO:

Provide a Skidmore-Wilhelm calibrator or an acceptable equivalent tension measuring device on the Project during erection. Ensure that the manufacturer's representative is present during the first full day of tensioning work to provide technical assistance. Verify each lot of DTIs using the Skidmore-Wilhelm calibrator as specified in NJDOT S-3.

THE FOLLOWING IS ADDED:

G. Light Pole Support Brackets.

Furnish and install light pole support brackets as shown on the contract plans. Use the materials specified on the contract plans. Use a paint system per section 912.01.01, finish coat color to match concrete color. Submit working drawings for approval. Coordinate fabrication of light support brackets with the light pole bases. Provide the following number of light pole support brackets:

BEHEMER ROAD PEDESTRIAN BRIDGE: 6 light support brackets.

MORRIS AVENUE PEDESTRIAN BRIDGE: 6 light support brackets.

506.03.04 Steel Pedestrian Bridges

THE FOLLOWING IS ADDED:

506.03.04.01 Description

This work includes the design, fabrication, and erection of steel pedestrian bridges in accordance with these Specifications and the concepts and details shown on the plans. The configuration and dimensions of the trusses and all other related elements shall be as shown on the plans. Include the bridge bearings, bridge deck joints, and concrete deck slab in the steel pedestrian bridge item. Design of all structural elements included in this specification in accordance with Section 1.3.4 of the New Jersey Department of Transportation – Bridge and Structures Design Manual – 4th Edition, 2002. The design provided may be a proprietary system or it may be produced by an independent structural steel fabricator experienced in the construction of the type of structures specified herein. All fabricators of the steel trusses shall be AISC certified for Major Steel Bridges. The same supplier/fabricator shall provide both truss bridges in the Contract.

Materials and construction operations shall be according to Section 506 of the Standard Specifications and the provisions noted herein.

Proposed suppliers must have at least five (5) years experience designing and fabricating these type structures and a minimum of five (5) successful bridge projects, of similar construction, each of which has been in service at least three (3) years. Submit a list for approval and include the location, bridge size, owner, and a contact for reference for each project. If the engineer determines that these qualifying criteria have not been met, the contractor's proposed supplier shall be rejected. The engineer's ruling shall be final.

Do not include providing and installing Chain Link Fence in the work required for this item. However, coordinate the design and fabrication of the steel pedestrian bridge with the fabrication and installation of the Chain Link Fence item of work.

506.03.04.02 Materials

All steel truss members shall be either square or rectangular hollow structural steel tubing conforming to ASTM A500. Welding shall conform to the requirements stipulated in the ANSI/AASHTO/AWS "Bridge Welding Code" and as shown in the Standard Specifications. Paint steel following the requirement of section 912.01.01 of the NJDOT Standard Specifications. Final coat color shall be black and shall be Federal Standard Color No. 27038.

Other steel elements shall be as specified in Subsection 506.02 of the Standard Specifications.

Concrete in deck slab shall be High Permorfance Concrete (HPC-1).

506.03.04.03 Design Calculations and Drawings

Submit complete design calculations, showing all design assumptions, loads and load combinations, stress checks for all members and connections, deflections and cambers, reactions at bearings, and other information necessary for a complete design of the bridges, for review and approval. Perform the analysis using any of the computer programs commonly used to evaluate this type of structure. Submit the program for approval before the beginnig of the design. Submit program assumptions, modeling methods, and accuracy verification for approval if requested. The configuration of the truss shall be as shown on the plans. No other options will be permitted. Top and bottom chord bracing patterns should utilize the same concepts and materials as the main trusses. The bottom chord shall

parallel the bridge deck profile and shall be cambered accordingly. The bridge shall have a minimum camber dimension at midspan of 3 inches. The minimum height of the top chord from the deck surface shall be at least equal to the height of the top of the chain link fence from the deck surface as depicted in the plans. The deck slab shall have a crown cross section with a 2% cross slope from the center to the curb lines except that the first 10 feet on each end of the span shall transition from the 2% cross slope to a level deck to match the adjacent ramps.

The basic design live load shall be 85 psf or an H10 truck. Application of these loads shall be as stipulated in the AASHTO design specifications. Total unfactored DL and LL reactions used for design of the pier supports were:

<u>DL</u> <u>LL</u> <u>TOTAL</u> 125 kips 40 kips 165 kips per pier

If the design selected by the supplier exceeds these values by more than 5%, the engineer shall be notified for evaluation of the new reactions.

Design and detail bridge bearings in accordance with the criteria specified on 506.03.04.01. Place bearings on pedestals as shown on the drawings. The bridge manufactrer shall determine dimensions and pedestal reinforcement. Provide fixed bearings on one end of the bridge, and expansion beatrings on the opposite end to allow movement under thermal expansion or contraction. The bridge manufacturer shall determine the movement and type of deck joints. The bridge manufacturer shall determine the number, diameter, minimum grade, finish, and embedment of all anchor bolts.

The bridge manufacturer shall furnish information as to bridge support reactions and anchor bolt locations after the bridge design is complete.

A Professional Engineer registered in the State of New Jersey shall prepare and sign all calculations and drawings.

Prepare Design Drawings that present all details necessary to construct the structures. Provide all drawings required by the NJDOT "Design Manual for Bridges and Structures" for the design and construction of standard highway bridges. Include drawings for the steel trusses including all secondary members and connections, bearings, concrete deck slab and curbing, and any other drawings required to completely detail the work that is to be performed. Provide shop drawings for all fabricated items in accordance with Subsection 105.05 of the Standard Specifications.

Include shipping and erection procedures. Also provide to the Department, a written Maintenance Manual, outlining inspection and maintenance procedures for the truss members and connections.

506.03.04.04 Fabrication and Construction

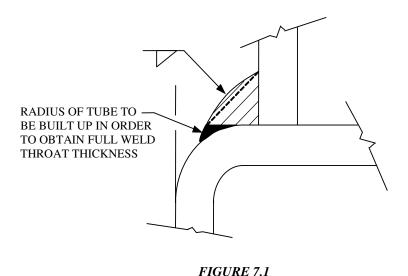
The truss bridge supplier shall coordinate all work with the General Contractor. Structure depth at the bearings shall be compatible with the variable height pedestal and the adjacent top of ramp elevation shown on the plans. The concrete bridge seat elevations were set accordingly. The height of the bearing type selected shall be set to provide the 3 inch camber drop and the vertical clearance shown on the plans. Anchor bolts and locations shall be provided to the Contractor prior to any pier cap concrete placement.

Erect each Structure in one piece as per the Traffic Staging requirements. Areas immediately adjacent to each site are available for full assembly of the truss prior to erection. Place concrete deck either before or after erection. If placed over traffic, provide temporary shielding to protect live traffic.

When the collection of water inside a structural tube is a possibility, either during construction or during service, provide a drain hole on the tube at its lowest point to let water out. Provide steel screens over all permanent drain holes.

The following shall apply to the welding of tubular members:

Special attention shall be given to developing sufficient weld throats on tubular members. Fillet weld details shall be in accordance with AWS D1.1, Section 3.9 (See AWS Figure 3.2). Unless determined otherwise by testing, the loss factor "Z" for heel welds shall be in accordance with AWS Table 2.8. Fillet welds which run onto the radius of a tube shall be built up to obtain the full throat thickness (See Figure 7.1). The maximum root openings of fillet welds shall not exceed 3/16" in conformance with AWS D1.1, Section 5.22. Weld size or effective throat dimensions shall be increased in accordance with this same section when applicable (i.e. fit-up gaps> 1/16").



The fabricator shall have verified that the throat thickness of partial joint penetration groove welds (primarily matched edge welds or the flare-bevel-groove welds on underhung floor beams) shall be obtainable with their fit-up and weld procedures. Matched edge welds shall be "flushed" out when required to obtain the full throat or branch member wall thickness.

BUILD UP RADIUS WELD

For full penetration butt welds of tubular members, the backing material shall be fabricated prior to installation in the tube so as to be continuous around the full tube perimeter, including corners. Backing may be of four types:

- 1. A "box" welded up from four (4) plates.
- 2. Two "channel" sections, bent to fit the inside radius of the tube, welded together with full penetration welds.
- 3. A smaller tube section which slides inside the spliced tube.
- 4. A solid plate cut to fit the inside radius of the tube.

Corners of the "box" backing, made from four plates, shall be welded and ground to match the inside corner radii of the chords. The solid plate option shall require a weep hole either in the chord wall above the "high side" of the plate or in the plate itself. In all types of backing, the minimum fit-up tolerances for backing must be maintained at the corners of the tubes as well as across the "flats".

506.03.06 Repair Galvanizing

THE LAST SENTENCE OF THE SECOND PARAGRAPH IS CHANGED TO:

If painting is directed, treat the galvanized surface according to the manufacturer's recommendations, then apply the epoxy intermediate and urethane finish coats only.

506.04 MEASUREMENT AND PAYMENT

THE FOLLOWING IS ADDED:

Include the cost of the light support brackets in the bid price for Strucutral Steel.

SECTION 507 – CONCRETE BRIDGE DECK AND APPROACHES

507.02.01 Materials

THE FOLLOWING IS ADDED:

Membrane Waterproofing	919.16
Styrofoam	
Closed Cell Neoprene Sponge	
Neoprene Bearing Pad Material	
Rubberized Joint Sealing Material	

507.03.03 Date Panel

THE FOLLOWING IS ADDED:

For Behmer Road and Morris Avenue Pedestrian Bridges install structure number plate provided by the RE by bolting the plate to concrete where indicated by the RE.

507.03.05 Concrete Parapet and Barrier Curb

THE SECOND PARAGRAPH IS CHANGED TO:

Cure using curing compound as specified 504.03.02.F. If drilling is required for subsequent construction, allow the concrete to cure for a minimum of 14 days before drilling.

507.03.06 4-Bar Open Steel Parapet

THE ENTIRE SUBSECTION IS CHANGED TO:

Ensure that the deck has cured for at least 14 days before placing concrete for 4-bar open steel parapet. Place concrete for 4-bar open steel parapet as specified in 504.03.02.D. Do not drill for 4-bar open steel parapet installation until the concrete has cured for at least 14 days. Install as shown on the Plans.

507.03.07 Concrete Bridge Approach

THE FOLLOWING IS ADDED:

Ensure the concrete conforms to the surface requirements as specified in 507.03.02 N, except each lot will be equal to the number of cubic yards of approach concrete placed in the lane.

507.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEMS ARE ADDED:

Item
1 3/4" X 1 3/4" PREFORMED ELASTOMERIC JOINT SEALER
2 1/2" BY 2 1/2" PREFORMED ELASTOMERIC JOINT SEALER
THE SECOND PARAGRAPH IS CHANGED TO:

Pay Unit
LINEAR FOOT
LINEAR FOOT

The Department will include payment for epoxy coated reinforcement steel for the bridge approach under the item CONCRETE BRIDGE APPROACH; for other concrete items, the Department will make payment for reinforcement steel under REINFORCEMENT STEEL, REINFORCEMENT STEEL, EPOXY-COATED, and REINFORCEMENT STEEL, GALVANIZED as specified in 504.04.

THE THIRD PARAGRAPH IS CHANGED TO:

The Department will measure ___ " BY ___ " PREFORMED ELASTOMERIC JOINT ASSEMBLY, ___ " BY ___ " PREFORMED ELASTOMERIC JOINT SEALER,STRIP SEAL EXPANSION JOINT ASSEMBLY, and MODULAR EXPANSION JOINT ASSEMBLY of the various sizes by the linear foot along the centerline, including the vertical face of curbs and tops of sidewalks and brush curbs.

THE FOLLOWING IS ADDED:

Concrete in the diaphragms is included in the quantity for the standard item CONCRETE BRIDGE DECK, HPC.

The Department will include payment for Sawcut Grooved Surface for the bridge deck under the item CONCRETE BRIDGE DECK, HPC.

The Department will include payment for Sawcut Grooved Surface for the bridge approach under the item CONCRETE BRIDGE APPROACH.

For Hoes Lane over Ambrose Brooke Structure, cost of membrane waterproofing, styrofoam, closed cell neoprene sponge, neoprene bearing pad material and rubberized joint sealing material is incidental to the standard item CONCRETE BRIDGE DECK. HPC.

For Behmer Road and Morris Avenue Pedestrian Bridges, closed cell neoprene sponge, is incidental to the standard item CONCRETE PIER COLUMN AND CAP.

THE FOLLOWING IS ADDED:

The Department will make a payment adjustment for concrete surface requirement quality in deck slabs and approach, by the following formula:

Pay Adjustment = $Q \times BP \times PR$

Where:

BP = Bid Price

Q= Surface Requirement Lot Quantity

PR= percent reduction as specified in Table 507.03.02-2

SECTION 508 - BRIDGE DRAINAGE

508.02 MATERIALS

THE FOLLOWING IS ADDED TO LIST OF MATERIALS:

THE FOLLOWING SUBPART IS ADDED:

508.03.03 Fiberglass Pipe and Fittings

Ensure that pipe supports are located at spacings that do not exceed the pipe manufacturer's recommendations. Avoid supports that have point contact or narrow supporting areas. Standard sling, clamp, and clevis hangers and shoe supports designed for use with steel pipe may be used. Ensure that the minimum strap width of all pipe hangers meets the pipe manufacturer's recommendations. Ensure that straps have a minimum of 120 degrees of contact with the pipe. On pipe

supported on surface with less than 120 degrees of contact use a split fiberglass pipe protective sleeve bonded in place with adhesive.

Ensure that all connections of pipes and fittings shown on the plans to facilitate future removal for maintenance cleanout or flushing are made with a threaded, gasketed coupler or a bolted gasketed flange system. Use only female – male threaded plugs for cleanouts.

508.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEM IS ADDED:

ItemPay Unit___" FIBERGLASS PIPELINEAR FOOT

SECTION 509 - BRIDGE RAILING AND FENCE

509.03.01 Bridge Railing

THE THIRD PARAGRAPH SUBPART 2 IS CHANGED TO:

2. Adhesive Type. Do not drill for installation until the concrete has cured for at least 14 days. Install adhesive anchors according to the manufacturer's recommendations. When drilling, ensure that spalling does not occur and existing utilities are not damaged. Repair damage to the existing concrete, utilities, and reinforcement steel as a result of drilling. Clean and dry drill holes before and during installation of the adhesive anchors.

SECTION 510 – TIMBER STRUCTURES

510.04 METHOD OF MEASUREMENT

THIS SUBSECTION HEADING IS CHANGED TO:

510.04 MEASUREMENT AND PAYMENT

SECTION 511 – BULKHEAD, FENDER, AND DOLPHIN SYSTEMS

511.02.01 Materials

14 TH ON THE LIST IS CHANGED TO:

SECTION 512 – SIGN SUPPORT STRUCTURES

512.04 MEASUREMENT AND PAYMENT

SECTION 513 - RETAINING WALLS

513.02.01 Materials

THE FOLLOWING IS ADDED:

For MSE Walls, use either Soil Aggregate, I-15 or Coarse Aggregate, No. 57. For Prefabricated Modular Retaining Walls and T-Wall, use either Soil Aggregate, I-9 or Coarse Aggregate, No. 57.

513.03.01 Proprietary Retaining Walls

F. Backfilling.

THE HEADING AND FIRST PARAGRAPH UNDER SUBPART (1) ARE CHANGED TO:

1. Soil Aggregate.

G. Compacting.

THE HEADING AND FIRST PARAGRAPH UNDER SUBPART (1) ARE CHANGED TO:

1. **Soil Aggregate.** With the exception of the 5-foot zone directly behind the units, compact soil aggregate with large, smooth drum, vibratory rollers using the density control method as specified in 203.03.02.D.

513.04 MEASUREMENT AND PAYMENT

THE FOLLOWING IS ADDED AFTER THE FIRST PARAGRAPH:

The Department will make payment for reinforcement steel under REINFORCEMENT STEEL, and REINFORCEMENT STEEL, EPOXY-COATED as specified in 504.04 for reinforcement steel in cast-in-place retaining walls.

THE FOLLOWING SECTION IS ADDED:

SECTION 515 - PERMANENT SOLDIER PILE WALLS

515.01 DESCRIPTION

The Contractor shall furnish all labor, materials, tools, supervision, transportation, installation equipment, and incidentals necessary to complete the work specified herein and shown on the Contract Drawings. The work shall include but not be limited to mobilization, surveying, installation of steel soldier piles, timber lagging, drainage systems, and cast-in-place concrete facing.

Cast-in-place concrete facing shall be constructed with Architectural Surface Treatment in accordance with the Special Provisions.

515.02 MATERIALS

- **A. Portland Cement Concrete.** Furnish Class B encasement concrete for steel soldier pile sockets as indicated, conforming to the requirements of Section 504 and 903 of the NJDOT Standard Specifications. Provide mix design for low strength encasement concrete above socket.
- **B. Steel Soldier Piles.** Steel soldier piles shall be of the type and weight shown indicated on the Contract Drawings. Steel soldier piles shall conform to AASHTO M270 Grade 50 (ASTM A709M, Grade 50). Galvanize in accordance with AASHTO M111 (ASTM A123).
- **C. Treated Timber Lagging.** Treated Timber Lagging shall be construction grade rough cut and shall be a minimum of 4" thick. Treated timber shall conform with section 915.
- **D. Lean-Mix Concrete Backfill.** Lean-mix concrete shall consist of Type I or Type II Portland cement, fine aggregate, and water. Each cubic yard of lean-mix concrete backfill shall consist of a minimum of one sack (42.7 kg) of Portland cement.

- **E. Fabricated Structural Steel.** Steel used to fabricate steel studs and other devices shall conform to the requirements of AASHTO M169 (ASTM A108). Galvanize in accordance with AASHTO M232 (ASTM A153).
- **F. Reinforcing Steel.** Reinforcing steel shall conform to ASTM A 615M, Grade 60.
- **G. Prefabricated Drainage Composite.** When required for the project and as called out on the Contract Drawings, the Contractor shall furnish prefabricated drainage composite that is a flexible product consisting of a geotextile bonded to an internal supporting core. The prefabricated drainage composite shall be resistant to deterioration from salts, road oils, fuels and other deleterious substances encountered in the type of application shown. Use AmerDrain 650, TerraDrain 203 or approved equal.
- **H.** Concrete Facing / Structural Concrete. Structural concrete shall conform to the requirements of Section 504 and 903 of the NJDOT, Standard Specifications. Structural concrete shall be Class A, unless otherwise noted on the Contract drawings.

515.03 CONSTRUCTION

- **A. General.** Wall elements constructed in accordance with this Specification shall be steel soldier piles placed in predrilled holes that are subsequently backfilled with Class B concrete and lean mix concrete.
- **B. Drilling Holes for Piles.** Use drilling rigs of the proper type and capacity for the proposed work and maintain in good operating condition to the satisfaction of the Engineer. It is likely that the drilled holes will be partially embedded in shale bedrock at some locations. When drilling through bedrock, use an auger head fitted with teeth specifically designed for cutting rock efficiently, or core the rock. Do not use shot drilling. Use core drilling, rotary drilling, percussion drilling, auger drilling or driven casing. Locate drill holes within 4 inches of the location shown on the plans at ground surface. Drill holes plumb, or to the inclination shown on the approved plans, and within tolerances specified in Section 503, Drilled Shafts. Unless otherwise specified or indicated, all piles will be drilled piles constructed as follows:
 - 1. Drilling Procedure and Depth. Observe the drilling rate and resistance as the boring of each hole is advanced, and record the relative drilling rate. If a satisfactory socket length is not obtained when the bottom of pile elevation indicated by design is reached, continue drilling to a greater depth until a minimum satisfactory socket length is obtained. During the drilling of each pile socket, record any soft seams, discontinuities, or decreases in drilling resistance. Evaluate the capability of the pile socket to support the lateral and vertical design loads. Increase the socket length as required, subject to the acceptance of the Engineer, to assure that a competent, non-yielding foundation socket is developed.
 - 2. Casing. Bored holes may require casings through fill or soil to prevent collapse of overburden, or, when necessary, to shut off seepage water. Keep the casing in place through the cleaning and inspection of the prebored holes, and withdraw either during or after concrete placement. While the casing is being withdrawn, a sufficient head of concrete should be maintained above the bottom of the casing, to prevent "necking" of the shaft due to sloughing soils.
 - 3. Cleaning of Predrilled Holes. After the holes have been drilled to the proper depth, remove all loose rock, earth, and debris and water from the bottom of the hole by approved methods acceptable to the Engineer. Make a complete check, and verify that all holes have been drilled to a sufficient depth to assure a competent, non-yielding socket foundation.
- C. Placing Piles. Set soldier piles and fill holes with concrete, after drilling of each hole is complete. Pour concrete within 12 hours after completion of drilling to avoid swelling of the shale at the bottom of the hole. If any water accumulates in the holes after cleaning and inspection, prior to concrete encasement, remove the water by approved method, or, alternatively, place the concrete at the bottom of the hole below the accumulated water by

tremie methods. A tip elevation tolerance of +/- one (1) foot is acceptable. Larger deviations must be approved by the Engineer. The vertical alignment of the piles shall not vary from the plan alignment by more than one (1) inch per foot of depth. Splicing of soldier piles shall not be permitted.

- **D. Excavation.** The Contractor constructing the wall shall be familiar with the sequence of wall excavation described in the project plans. Placement of timber lagging shall immediately follow excavation in front of the wall.
- **E. Blasting.** Blasting is not allowed.
- **F.** Treated Timber Lagging Installation. Timber lagging shall be placed from the top-down in sufficiently small lifts immediately after excavation to prevent erosion of materials into the excavation. Prior to lagging placement, the soil face shall be smoothed to create a contact surface for the lagging. A gap shall be maintained between each vertically adjacent lagging board for drainage between adjacent lagging sections. In no case shall lagging be placed in tight contact to adjacent lagging.

G. Drainage System Installation.

- 1. The Contractor shall handle the prefabricated drainage composite in such a manner as to ensure the composite is not damaged in any way. Care shall be taken during placement of the composite not to entrap dirt or excessive dust in the composite that could cause clogging of the drainage system. Delivery, storage, and handling of the drainage composite shall be based on manufacturer's recommendations.
- 2. Drainage composite strips shall be placed and secured tightly against the timber lagging with the fabric facing the lagging. A continuous sheet of drainage composite that spans between adjacent soldier piles shall not be allowed. Seams and overlaps between adjacent composites shall be made according to manufacturer's recommendations and specifications. Repairs shall be made at no additional cost to the Department and shall conform to manufacturer's recommendations.
- 3. Perforated collection pipes shall be placed at the bottom of the drainage composite to the flow line elevations and at the locations shown on the Contract Drawings. Outlet pipes shall be placed at the low end of each collector pipe placed between each soldier pile as shown on the Contract Drawings.

515.04 MEASUREMENT AND PAYMENT

Payment will be made in accordance with Section 513 (Retaining walls) under:	
Item	Pay Unit
RETAINING WALL, LOCATION NO	SQUARE FOOT

Permanent soldier pile walls will be measured for payment in accordance with Section 513 (Retaining Walls) of the NJDOT Standard Specifications.

No separate payment will be made for furnishing all labor, materials, equipment, setup, mobilization and demobilization, and incidentals necessary to satisfactorily complete the work as shown on the contract drawings and specified herein.

DIVISION 600 – MISCELLANEOUS CONSTRUCTION

SECTION 601 – PIPE

601.01 DESCRIPTION

THE FOLLOWING IS ADDED TO THIS SUBSECTION

This Section also describes the requirements for constructing concrete encasement around existing fiber optic ducts owned by ABOVENET.

601.02 MATERIALS

THE FOLLOWING IS ADDED TO THIS SUBSECTION:

Ductile Iron Pipe

909.02.08

601.03 CONSTRUCTION

601.03.01 Installing Pipe

B. Excavating

THE FOLLOWING IS ADDED TO THIS SUBPART:

At locations designated on the Plans, locate existing fiber optic ducts owned by ABOVENET and excavate a trench along the ducts. Finish excavation by hand exercising care to not damage the ducts.

Prior to constructing the proposed crossing drainage pipe at these locations, construct concrete encasement around the fiber optic ducts per construction detail (see Attachment D - Abovenet Details of these Special Provisions).

601.04 MEASUREMENT AND PAYMENT

THE FOLLOWING IS ADDED TO THIS SUBSECTION:

___" DUCTILE IRON PIPE CONCRETE ENCASEMENT

LINEAR FOOT CUBIC YARD

SECTION 602 – DRAINAGE STRUCTURES

602.01 DESCRIPTION

THE FOLLOWING IS ADDED TO THIS SUBSECTION:

This Section also describes the requirements for constructing outlet control structures and Manufactured Treatment Devices (MTD).

602.02 MATERIALS

THE FOLLOWING IS ADDED TO THIS SUBSECTION:

Provide pipe materials as specified in Subsection 601.02.

Ensure precast sections of MTDs have tongue and groove or ship-lap joints.

Fabricate precast components of MTDs according to 904.01.

Ensure aluminum plate components are aluminum alloy 5052-H32 according to ASTM B209.

Use NJDOT manhole frames and covers according to 909.03 to provide MTD access.

MTDs are required to be listed as a Certified Stormwater Technology at NJDEP's website www.njstormwater.org.

Ensure that the MTDs meet the following requirements:

- 1. The MTD meets the requirements of AASHTO HS-25 Highway Bridge Loading.
- 2. The MTDs meet the requirements as shown on the Plans.
- 3. The minimum pollutant removal rate is 50%. Provide a current certification letter from New Jersey Corporation of Advanced Technology (NJCAT) stating the minimum pollutant removal rate.
- 4. The MTD is a swirl type hydrodynamic separator and includes a circular chamber to induce a swirling flow pattern that will accumulate and store settled solids in a manner and a location that will prevent re-suspension of previously captured particulates.
- 5. The maintenance of the MTD is performed through the utilization of a vacuum truck and does not require the disassembly of the device to access the debris, trash, sediment, or other waste material. Access to the MTD is through one or more manhole riser structures. Under normal conditions, a person is not required to enter the device to perform maintenance.
- 6. Design the MTD to treat the runoff generated by the water quality storm as shown on the Construction Details.

Below is a list of manufacturers capable of manufacturing MTDs:

- 1. AquaShield 2705 Kanasita Dr., Chattanooga, TN
- 2. CONTECH Construction Products, Inc. 521 Progress Dr., Linthicum, MD
- 3. Hydro International 94 Hutchins Dr. Portland, ME

602.03 CONSTRUCTION

602.03.02 Inlets and Manholes THE FOLLOWING IS ADDED TO THIS SUBPART: The requirements of this Subpart shall apply to the construction of outlet control structures, Manholes (Type ______), and Inlets, Non-Standard (Type ______). Submit working drawings for outlet control structures according to Section 105. Submit working drawings and design calculations according to Section 105 for Manholes (Type ______) and Inlet, Non-Standard (Type ______) in accordance with Section 105. Drainage structures loading shall be according to AASHTO HS-20 Highway Bridge Loading requirements.

602.03.03 Setting Castings, Resetting Castings, and Reconstructing Inlets and Manholes THE FOLLOWING IS ADDED TO THIS SUBPART:

Sanitary sewer manholes shall be reconstructed or reset as specified in 652.03.06 and 652.03.07.

THE FOLLOWING SUBPART IS ADDED:

602.03.09 Manufactured Treatment Devices

Submit working drawings to the RE for approval for MTDs inclusive of diversion structure, drainage structures and drainage pipes include design calculations for the loading requirements of the MTD. Submit a detailed list of material specs for the MTD.

Excavate as specified in 202.03.03.

Install pipe as specified in 601.03.01.

Construct drainage structures as specified in 602.03.02.

Restore disturbed areas with topsoil, fertilizer, and seeding as specified in 804 and 806.

Clean MTDs during construction according to the manufacturer's requirements as well as immediately prior to Substantial Completion.

602.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEMS ARE ADDED:

Item	Pay Unit
OUTLET CONTROL STRUCTURE	UNIT
MANHOLES (TYPE)	UNIT
INLET, NON-STANDARD (TYPE)	UNIT
MANUFACTURED TREATMENT DEVICE NO.	UNIT

SECTION 603 – SLOPE AND CHANNEL PROTECTION

603.01 DESCRIPTION

THE FOLLOWING IS ADDED:

This Section describes the requirements of furnishing, constructing and installing outfall scour holes.

603.02 MATERIALS

603.02.01 Materials

THE FOLLOWING IS ADDED TO THIS SUBSECTION:

Provide materials as specified:

Gabion Basket Stone

To fill gabion baskets, use stones that consist of a uniformly graded mixture of rock conforming to 901.03.01, such that 50 percent of the mixture by weight is equal to or larger than the designated median stone size (d_{50} =6"). Ensure that the stones are a well-graded mixture composed primarily of the larger stone sizes, but with a sufficient quantity of other

sizes to fill the progressively smaller voids between the stones. Ensure that the diameter of the largest stone size is less than 1.5 times d_{50} .

603.03 CONSTRUCTION

THE FOLLOWING SUBPARTS ARE ADDED:

603.03.05 Riprap Stone Scour Protection

Excavate as specified in 202.03.03. Construct the footings, abutment wall and wingwalls. Shape and compact the underlying material to produce a firm even surface.

Place geotextile over the entire area where riprap is top be placed and extend it al least 12 inches on each side. Bury the geotextile that is extended outside of the riprap area a minimum of 6 inches into the soil. When joining sections of geotextile, overlap the geotextile by a minimum of 18 inches in the direction of flow.

Place a 6-inch layer of coarse aggregate without damaging or dislodging the geotextile.

Firmly bed the riprap stones into the coarse aggregate without damaging or displacing the geotextile. Use larger riprap stones in the lower courses. Fill spaces between the riprap stones with smaller stones of the same type and quality. Firmly ram the smaller stones into place. Provide an even, finished surface for the scour protection.

Remove cofferdam after installing the riprap.

603.03.06 Outfall Scour Hole

At least 10 days before beginning the work, submit the working drawings to the RE for approval.

Excavate as specified in <u>202.03.03</u>. Shape and compact the underlying material to produce a firm, even surface. Install the geotextile. If sections of geotextile need to be joined, overlap the sections a minimum of 18 inches. Permanently cover the geotextile within 48 hours of placement. Place and grade coarse aggregate without damaging the geotextile. Install gabion mattresses according to construction details and approved working drawings.

603.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEMS ARE ADDED:

 $\begin{array}{ll} \textit{Item} & \textit{Pay Unit} \\ \textit{RIPRAP STONE SCOUR PROTECTION } (D_{50} = _\text{"}) & \textit{CUBIC YARD} \\ \textit{OUTFALL SCOUR HOLE} & \textit{SQUARE YARD} \\ \end{array}$

THE FOLLOWING IS ADDED TO THIS SECTION:

The Department will measure the quantity of OUTFALL SCOUR HOLE by measuring the surface area of the installed gabion mattress.

SECTION 605 – FENCE

605.01 DESCRIPTION

THE FOLLOWING IS ADDED TO THE END OF THIS SUBSECTION:

This section also describes the requirements for constructing a 6 foot high industrial/commercial strength ornamental fence and gate, a 10 foot high enclosed chain link fence on the pedestrian bridges, and handrails on the pedestrian bridge ramps and steps.

This section also describes the requirements for the furnishing of materials and the construction of a six foot high vinyl privacy fence in the location shown on the plans.

605.02.01 Materials

THE FOLLOWING IS ADDED AFTER THE LIST OF MATERIALS:

Provide material for ornamental fence framework and gate (i.e., pickets, rails, posts, post caps, latch, hinges, brackets, ect.). Match fence framework and gate, posts, fasteners, and other appurtenances to color chip number 27038 (black) of the Federal Standard 595B Color Fan Deck (July 1994).

Provide materials galvanized according to ASTM A653, coating designation G-90, hot dip process. Provide materials that have been subjected to a six stage pretreatment/wash with zinc phosphate followed by an electrostatic spray application of a two-coat powder system during their manufacture. Ensure the base coat is a zinc-rich thermosetting epoxy powder coating, gray in color, with a minimum thickness of 2 mils. Ensure the top coat is a no-mar TGIC polyester powder coat finish, black in color, with a minimum thickness of 2 mils. Ensure the framework has a salt spray resistance of 3,500 hours without loss of adhesion tested using Test Method B1117.

Provide ornamental fence with 1-inch square pickets spaced 4-inches apart, 1.75-inch square rails with 0.125-inch diameter galvanized steel picket retaining rods, and 2.5-inch square posts spaced at 8 feet O.C. Nom. Provide high quality PVC grommets to seal all picket-to-rail intersections.

Provide pre-cut pickets, rails and posts for ornamental fence. Provide pre-punched rails and predrilled pickets. Ensure there are no exposed fasteners.

Provide ornamental fence panels that are biasable to a 25% change in grade.

Provide ornamental fence from the following manufacturers:

- 1. Ameristar AEGIS II industrial, Majestic Style M3 ornamental fence
- 2. Delgard commercial Stratford
- 3. Jerith Style I202

Materials and construction operations for Handrail and Chain-Link Fence on pedestrian bridges shall be in accordance with Section 509 of the Standard Specifications and the provisions noted herein.

Chain-Link Fence, PVC-Coated Steel shall be black in color.

Vinyl Fence

Construct fence sections including pickets, rails, posts and caps with materials made of high impact, ultra-violet (UV) resistant, rigid Poly Vinyl Chloride (PVC) that meets or exceeds ASTM DI784 Class 14344B in color white. Provide a minimum thickness of 0.17 inches for all fence parts, except where specified otherwise. Mold post caps to one piece, with a cross section sized as required for installation to the top of the posts. Supply fence from one of the following manufacturers or an approved equal:

1. Bufftech Vinyl Fence Products www.bufftech.com

Model: Chesterfield

2. UltraGuard Fencing and Railing www.ultraguardvinylfence.com Model: Tongue & Groove

3. Country Estate Fence www.countryestate.com

Model: Lakeland

Follow manufacturer's specification for fence fastening hardware.

Provide Class 'B' concrete for footings.

605.03 CONSTRUCTION

THE FOLLOWING IS ADDED TO THIS SUBSECTION:

Submit working drawings for ornamental fence in accordance with Section 105.

Install ornamental fence according to the manufacturer's recommendations. Ensure that installed panels are capable of supporting a 600 pound load applied at midspan without sustaining permanent deformation.

605.03.01 Chain-Link Fence

THE FOLLOWING PARAGRAPHS ARE ADDED:

Detail and construct a fence in conformance with the NJDOT Standard Bridge Construction Details for "Bridge Chain Link Fence (Curved Top)" (BCD-509-1), except as modified herein. The fence constitutes a 10 feet high enclosure, as measured from the center of the pedestrian bridge decks at the misdspan, as shown on the contract drawings. The fence shall measure 9' feet vertically from the top of the parapet to the inside (lower) surface of the topmost rail at the midspan. Use the standard EC/BC and PC/DC connections, as appropriate according to the standard drawing for the rail to post connections. Bend each post from a single length of structural tube, do not splice posts without providing calculations to demonstrate the adequacy of the modification. Position the fence posts and base plates on top of the 1 foot high bridge parapet according to the standard fence details.

The inside of the curved portion of the posts shall have an inside radius of 4 feet and 2 inches (4 feet and 3 inches centerline radius) with horizontal rails spaced at 30degrees intervals on-center. Place the lowermost horizontal rails along the curved portion of the posts at 30degrees from level on-center, as shown on the standard drawing. Evenly space 3 horizontal rails along the vertical portions of the posts. Place the upper and lower horizontal rails along the vertical portions of the posts as shown on the standard drawing. Include all horizontal rails as described herein within each fence unit along the bridge.

Attach a pedestrian grab bar to the interior of each side of the fence enclosure. The grab bar shall consist of aluminum alloy 6061-T6, 1 1/4 inch diameter, schedule 80 pipe. Attach the grab bar to each rail post along the length of the fence. Follow the grab bar connection detail included in the contract drawings for the ramp grab bars to detail the grab bar-to-post connection, with the exception that: 1) the bend rod is a 7/8" diameter, aluminum alloy 6061-T6, and 2) do not weld the bend rod directly to the fence post without providing calculations showing the adequacy of the modification. In lieu of welding directly to the fence post, weld the bent rod to an aluminum alloy plate bolted to the post using stainless steel bolts. Use plates and bolts of adequate dimensions to transfer a 250 pound concentrated pedestrian load applied in any direction and at any location along the handrail. Make the grab bar continuous with the grab bar from the approach ramps by way of a splice detail similar to the grab bar splice detail shown in the contract drawings for the ramp grab bar, except that the splice pipe and screw shall be stainless steel. Use ASTM A 320, Class 1, Grade B8 stainless steel bolts and screws, and stainless steel splice pipe schedule 80, non-magnetic type 304. Make any splices within the length of the aluminum grab bar, other than at the ends, of a schedule 80 aluminum splice tube and stainless steel screw.

THE FOLLOWING IS ADDED:

605.03.05 Handrail

This work includes the fabrication and erection of steel railing and grab bars on Behmer Road and Morris Avenue pedestrian bridges ramps, landings, and steps. The materials, configuration and dimensions of the railing, grab bars,

and all other related elements shall be as shown on the plans. Construct welds according to the requirements of AWS D1.1 Structural Welding Code. Use bolts and bolting materials as specified in 908.01. Paint as specified in 906.06. Final coat color shall be black and shall be Federal Standard Color No. 27038.

At least 30 days before beginning the work, submit working drawings for certification. The drawings shall include fence configurations including all post and anchorage locations, material designations, member, connection and anchorage details, and all other relevant information pertaining to the fabrication and erection of the handrail system.

Establish the final post spacing in accordance with the general spacing, clearance, and other guidelines shown on the plans. Notify the Engineer if the general dimensional guidelines shown on the plans cannot be held. Provide anchor bolts and locations before any related concrete placement. Posts and ballusters shall be vertical. Rails and grab bars shall follow the grade of the supporting structure. Grab bars on ramps, landings, and steps shall always be continuous and shall connect to the chain link fence grab bar as described on section 605.03.01 of the special provisions.

605.03.06 Vinyl Fence

Construct the fence in accordance with the manufacturer's specifications. Submit shop drawings to the RE showing clearly all materials, finishes and connections.

605.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEMS ARE ADDED:

ItemPay UnitORNAMENTAL FENCELINEAR FOOTHANDRAILLINEAR FOOTVINYL FENCELINEAR FOOT

THE FOLLOWING IS ADDED:

The Department will measure HANDRAIL in linear feet along the bottom rail for the handrail system. Include the cost of the posts, rails, grab bars, and all associated hardware and labor in the cost of the HANDRAIL.

The Department will measure the chain-link fence along the bottom line of fabric on one side of the enclosure. Include the cost of the posts, rails, grab bars, chain-link fence and all associated hardware and labor in the cost of the CHAIN-LINK FENCE, ALUMINUM-COATED STEEL, 10'-0" HIGH.

Include the cost of furnishing and installing the Vinyl Fence complete and includes fence pickets, rails, posts, caps, fastening hardware and concrete for post footings in the cost of VINYL FENCE.

SECTION 606 – SIDEWALKS, DRIVEWAYS, AND ISLANDS

606.01 DESCRIPTION

THE FOLLOWING IS ADDED TO THIS SECTION:

This section describes the requirements of furnishing, designing, and installing turf pavers.

This section also describes the requirements for constructing imprint resin island.

606.02 MATERIALS

606.02.01 Materials

THE FOLLOWING IS ADDED TO THIS SECTION:

Provide materials as specified:

Turf Paver Systems:

- 1. Geoblock 5150 System; Presto Products, Inc., Appleton, WI
- 2. Tuff Track Grassroad Paver TT-24; NDS, Inc., Lindsay, CA
- 3. Grass Pavers; RK Manufacturing, Inc., Jackson, MS
- 4. Grass pave2; Invisible Structures, Inc., Aurora, CO Or approved equal.

Provide product sample, technical specifications and manufacturer's installation instructions for Department approval.

Coarse Aggregate	901.06.01
Fine Aggregate	901.06.02
Dense-graded Aggregate (DGA)	901.10
Soil Aggregate	901.11
Concrete	903.03
Topsoil	917.01
Fertilizer	917.03
Pulverized Limestone	917.04
Seed Mixture	
Mulch	
Tackifiers	
Geotextiles	919.01

For Imprint Resin Island, use a hot applied wearing surface that is a mixture of thermoplastic resins, polymer, rubber, aggregates, glass fibers, pigments and/or fillers that produce a product with superior adhesion, flexibility and abrasion resistance characteristics as well as color stability, chemical resistance and scrub ability. Ensure that it is capable of being produced in the specified color and pattern, and it has been developed specifically for use on asphalt and concrete pavement. The below list of companies can produce the required material.:

- 1. BrickPrint by Traffic Calming USA, 266 South Main Street, Suite 800, Dallas, Georgia, 30132, 770-505-4044 or at www.trafficcalmingusa.com
- 2. TECHPRINT by Crafco, 420 N. Roosevelt Ave., Chandler, AZ 85226, 1-800-528-8242 or www.crafco.com
- 3. StreetPrintXD by Integrated Paving Concepts, PMB 48, 936 Peace Portal Drive, Blaine, WA, 98230-4040, 1-888-581-2299 or www.integratedpaving.com

Provide material to match color chip number 21105 (red) of the Federal Standard 595B Color Fan Deck (July 1994).

Ensure that the imprint resin island material meets the requirements in Table 606.02.01-1.

Table 606.02.01-1 Imprint Resin Island Material Properties		
Property	Test Method	Requirement
Water Absorption, maximum	ASTM D 570	0.5%
Softening Point, minimum	ASTM D 36	200°F
Bond Strength, minimum	ASTM D 4796	300 psi
Impact Resistance, minimum	ASTM D 256, Method A	10 in-lbs
Flash Point, minimum	ASTM D 92	440°F
Skid Resistance, minimum	ASTM E 303	55
Low Temperature Stress Resistance	AASHTO T 250	No cracks

Ensure that pigment used for imprint resin island is well dispersed in the resin. Ensure that the pigment, or any other materials in the imprint resin island, does not contain lead, lead chromate or hexavalent chromium. Ensure that the imprint resin island material, upon heating to application temperature, does not exude fumes that are toxic or injurious to persons or property.

As cover aggregate for the imprint resin island, use only manufactured stone sand that conforms to 901.05.02 except that not more than 5 percent passing No. 200 sieve is permitted.

606.03 CONSTRUCTION

606.03.02 Concrete Sidewalks, Driveways, and Islands

H. Protection and Curing.

THE LAST SENTENCE IS CHANGED TO:

Ensure vehicles and other loads are not placed on sidewalks, islands, and driveways until the concrete has attained compressive strength of 3000 pounds per square inch, as determined from 2 concrete cylinders field cured according to AASHTO T 23.

THE FOLLOWING IS ADDED TO THIS SECTION:

606.03.04 Imprint Resin Island

Submit product data in accordance to the RE with the Materials Questionnaire. Submit samples showing color, texture, and pattern to the RE for approval.

Prepare the HMA pavement area that is to receive the imprint resin material by removing all dirt, debris, salts, concrete admixtures, and any chemical residues. Ensure the hot applied resin is not installed when precipitation is expected or temperatures are below 32 °F.

Prepare the imprint resin material for installation utilizing a heating kettle specifically designed for hot applied mixed resin. Ensure the material is heated to within a temperature range of 385 °F to 420 °F. Uniformly distribute the hot applied resin material onto the pavement surface by means of preheated finishing irons that are used to smooth and level the material. Immediately apply dry sand over the hot applied resin to cover the surface at an approximate rate of 1.75 lb/sf. Immediately after applying the sand, stamp the pattern into the semi-molten resin material using an approved stamp capable of providing a 5/16 inch $\pm 1/16$ inch deep impression. Ensure the stamp has a brick pattern.

Allow the hot applied resin to cure for a minimum of 1 hour until the material has hardened and remove all excess sand from the surface.

606.03.05 Turf Pavers

Provide layout, structural design, and installation for each designated location based on manufacturer's design guidelines for Department approval.

Design Criteria:

- a. Relatively level parking area for minimum 40,000 lb. utility truck. Allot space for truck stabilizers.
- b. Provide for safe ingress/egress with turnaround slots where needed.

Installation:

- a. Install pavers after all footings/foundations and other grading at given site is complete.
- b. Prepare subgrade and base as per manufacturer's instructions and design load.
- c. Set and anchor turf pavers as per maufacturer's instructions.
- d. Infill turf pavers with topsoil or Department approved growing medium as per manufacturer's instructions.
- e. Fertilize and seed with Type D seed mix as specified in Section 806.
- f. Mulch seeded areas as specified in 809.03.01.

606.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEMS ARE ADDED:

Item
IMPRINT RESIN ISLAND
TURF PAVERS, CONCRETE

Pay Unit SQUARE YARD SQUARE YARD

SECTION 607 - CURB

607.01 DESCRIPTION

THE FOLLOWING IS ADDED TO THIS SUBSECTION

This Section also describes the requirements for constructing concrete barrier pylons.

607.03.01 Concrete Barrier Curb

D. Placing Concrete.

THE THIRD SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

To place concrete between November 1 to March 15, submit to RE for approval a plan detailing the method of protecting the concrete from salt for at least 30 days after placing.

THE FOLLOWING IS ADDED TO THIS SECTION:

607.03.08 Concrete Barrier Pylon

Construct concrete barrier pylon as specified in 607.03.03. Subsection 607.03.03.C does not apply. To place concrete between November 1 to March 15, submit to RE for approval a plan detailing the method of protecting the concrete from salt for at least 30 days after placing.

607.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEM IS ADDED:

Item
CONCRETE BARRIER PYLON

Pay Unit LINEAR FOOT

THE LAST SENTENCE IS CHANGED TO:

The Department will measure curb and pylons along the face of the gutter line.

THE ENTIRE SECTION IS CHANGED TO:

SECTION 608 – NON-VEGETATIVE SURFACES

608.01 DESCRIPTION

This Section describes the requirements for constructing non-vegetative surfaces of HMA; color-coated HMA; porous HMA; broken stone, and polyester matting.

608.02 MATERIALS

608.02.01 Materials

Provide materials as specified:

Broken Stone, Coarse Aggregate No. 3	901.03
HMA (9.5M64)	902.02
Asphalt-Stabilized Drainage Course	902.06
Non-Vegetative Surface Coating	912.02.04
Herbicide	917.11.03
Polyester Matting	919.15

Non-Vegetative Surface, Porous HMA shall conform to the requirements of Asphalt-Stabilized Drainage Course.

608.02.02 Equipment

Provide equipment as specified:

HMA Compactor	1003.05
Vibratory Drum Compactor.	1003.06
HMA Plant	1009.01
HMA Trucks.	1009.02

608.03 CONSTRUCTION

608.03.01 Non-Vegetative Surface, HMA

Excavate as specified in 202.03.03. Shape and compact the underlying material to produce a firm, even surface. Obtain RE approval before finishing excavation. If the RE determines that the bottom of the excavation is unstable, undercut, backfill, and compact as directed by the RE.

Construct the non-vegetative surface, HMA before installing guide rail. Obtain RE approval for alternate methods of construction.

Deliver HMA as specified in 401.03.03.D. Construct non-vegetative surfaces 4 inches thick. Place and compact the material to produce a surface free of roller marks and ridges. Spread and grade the HMA as specified in 401.03.03.E. Ensure that the finished surface is smooth, even, and graded to drain away from the guide rail. Compact HMA as specified in 401.03.03.F. Spread, rake, and lute areas not accessible to pavers and rollers with hand tools and compact with dynamic compactors.

Repair non-vegetative surface damaged by guide rail installation with HMA. Use hand tampers around posts and other obstacles where mechanical compactors are not accessible.

608.03.02 Color-Coated Non-Vegetative Surface, HMA

Construct color-coated non-vegetative surfaces as specified in 608.03.01.

Uniformly apply the final color at the rate of 0.3 to 0.5 gallons per square yard by spraying, brushing, or squeegeeing over the HMA surface course. Ensure that the surface is clean and dry at the time of application. Reapply the coating to any missed spots or areas to obtain a uniform coating.

Avoid spilling the color coating on adjacent surfaces. If the color coating spills, immediately clean it with water before the coating dries. If the coating dries, repair as directed by the RE.

The RE will not allow traffic on the color-coated surface until it is dry.

608.03.03 Non-Vegetative Surface, Broken Stone

Ensure that areas to receive non-vegetative surface, Broken Stone, are free from vegetation. Vegetation removal may require manual removal, herbicide treatment as specified in 608.03.06 or both.

Apply a pre-emergent herbicide to the area before placement of broken stone. Spread broken stone, aggregate size No. 3, in a uniform layer, to prescribed thickness.

608.03.04 Non-Vegetative Surface, Porous HMA

Ensure that areas to receive non-vegetative surface, Porous HMA, are free from vegetation. Vegetation removal may require manual removal, herbicide treatment as specified in 608.03.06 or both. Excavate as specified in 202.03.03. Shape and compact the underlying material to produce a firm, even surface. Obtain RE approval before finishing excavation. If the RE determines that the bottom of the excavation is unstable, undercut, backfill, and compact as directed by the RE.

Construct the non-vegetative surface, porous HMA before installing guide rail. Obtain RE approval for alternate methods of construction.

Construct porous HMA surface course to prescribed thickness according to the requirements of Section 303 except for the application of prime coat. Repair non-vegetative surface damaged by guide rail installation with porous HMA. Use hand tampers around posts and other obstacles where mechanical compactors are not accessible.

608.03.05 Non-Vegetative Surface, Polyester Matting

Install polyester matting according to the manufacturer's requirements by manufacturer certified workers.

Ten days before installation, submit to the RE a list of manufacturer certified workers and one copy of the "engineering package" including demonstration compact discs and samples of product components; such as foot prints, finished seams, etc. The manufacturer may elect to train the workers and Department inspectors on a test section on the worksite.

Ensure that the surface areas to receive the matting are smooth, firm, stable and free of rocks, clods, foliage, roots or other material which might prevent the matting from lying in direct contact with the ground surface, free of wrinkles or bulges. Existing non-vegetative surface or HMA that is in the same location as proposed polyester matting may be left in place as long as its surface area is properly prepared as previously stated. Mow grass as low as possible prior to installation of matting. Install the matting immediately following installation of guide rail posts and prior to installation

of the guide rail hardware by lifting the matting above the posts and allowing it to drop to the ground with the posts passing through prefabricated openings.

Stake the matting along its edges in accordance with the manufacturer's recommendations.

Seal matting openings with a separate prefabricated piece of matting that will provide a snug fit around the post and completely cover the opening. Ensure that seams are sealed.

Ensure that the matting surface is vegetation-free from installation until final acceptance. Vegetation removal may require herbicide treatment, mechanical removal, or both, as specified in 608.03.06.

608.03.06 Post-Emergent Weed Control of Non-Vegetative Surfaces

Manually remove or spray vegetation growing on the non-vegetative surface with a post-emergent non-selective herbicide treatment for total control of vegetation on the non-vegetative surface area, as directed by the RE. The post-emergent herbicides selected for control of targeted vegetation shall be based on the manufacturer's recommendations and product label. Begin the work associated with vegetation removal as early as the conditions permit. Herbicides must be applied by, or under the direct supervision of, a Certified Commercial Pesticide Applicator, according to the manufacturer's recommendations. Restore areas where herbicide has been applied and not intended to its prior existing condition at no cost to the State. Do not apply herbicide in the rain or when wet weather is expected within 24 hours. Do not apply herbicide after rain until approved by the RE.

The RE will notify the ME after Acceptance for inclusion of the non-vegetative surface in its herbicide spraying program including the date that the herbicide was last applied on the project section.

608.04 MEASUREMENT AND PAYMENT

The Department will measure and make payment for Items as follows:

Item	Pay Unit
NON-VEGETATIVE SURFACE, HOT MIX ASPHALT	SQUARE YARD
COLOR-COATED NON-VEGETATIVE SURFACE, HOT MIX ASPHALT	SQUARE YARD
NON-VEGETATIVE SURFACE, BROKEN STONE,THICK	SQUARE YARD
NON-VEGETATIVE SURFACE, POROUS HOT MIX ASPHALT,THICK	SQUARE YARD
NON-VEGETATIVE SURFACE, POLYESTER MATTING	SQUARE YARD

When the RE directs undercutting of unstable material in the excavation area, the Department will make payment, as specified in 104.03.03, for the additional excavation. The Department will also make payment, as specified in 104.03.03, for the additional bedding if there is not an excess of excavated material available for use as bedding.

SECTION 609 – BEAM GUIDE RAIL

609.03.01 Beam Guide Rail

THE SEVENTH PARAGRAPH IS CHANGED TO:

Install flexible delineators with white retroreflective sheeting on the right side of the direction of traffic. Install flexible delineators with yellow retroreflective sheeting on the left side of the direction of traffic. Mount flexible delineators on the blockout of beam guide rail using either a "U" channel base on the I-beam blockout or a flat base attached to a wood, polymer, or other solid top blockout. Attach the base to the blockout using an adhesive recommended by the manufacturer of the base and panel.

609.03.03 Terminals and Anchorages

THE FOLLOWING IS ADDED:

Excavate cut slope as specified in 202.03.03 within the limits of the buried guide rail terminal. Drive beam guide rail posts for buried guide rail terminal to the required position. Ensure that posts are driven plumb, properly spaced, and to the line and grade shown. Attach the beam guide rail element to the spacer at every post. Attach the beam guide rail

element and plate to the terminal posts. Align the top edge of the beam guide rail element in a straight line. Where a vertical transition is required, ensure that the top edge of the beam guide rail element forms the chords of a smooth vertical curve. Backfill with excavated material as specified in 203.03.02C.

609.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEM IS ADDED:

Item
BURIED GUIDE RAIL TERMINAL

Pay Unit UNIT

SECTION 610 - TRAFFIC STRIPES, TRAFFIC MARKINGS, AND RUMBLE STRIPS

610.03.03 Raised Pavement Markers (RPM)

THE FOLLOWING IS ADDED TO THIS SUBPART:

Install RPMs on the following roadways:

Route 18 (Hoes Lane)

Route 18 (Centennial Avenue)

Route 18 (Possumtown Road)

Morris Avenue

Hoes Lane West

Old Hoes Lane

Park Avenue

Buena Vista Avenue

Lincoln Avenue

Skiles Avenue

Skiles Avenue Extension

Sidney Road

Telcordia Drive

Lloyd Drive

Behmer Road

Knightsbridge Road

Fitz Randolph Road

Centennial Avenue

Old New Brunswick Road

Ramps A/B (I-287)

610.03.06 Ground Mounted Flexible Delineators

THE FIRST PARAGRAPH IS CHANGED TO:

Use white retroreflective sheeting for delineators located on the right side when facing in the direction of traffic. Use yellow retroreflective sheeting for delineators located on the left side when facing in the direction of traffic.

THE FOLLOWING IS ADDED TO THIS SUBPART:

Install ground mounted flexible delineators along the following roadways:

Route 18 (Hoes Lane)

Route 18 (Centennial Avenue) between Stations 2387+00 and 2525+77

Route 18 (Possumtown Road) between Station 2516+00 (Baseline Route 18 (Possumtown Road)) and Station 14+23 (Baseline Existing Possumtown Road).

610.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEM IS DELETED:

Item RPM, BI-DIRECTIONAL, WHITE LENS

Pay Unit UNIT

SECTION 612 - SIGNS

612.01 DESCRIPTION

THE FIRST PARAGRAPH IS CHANGED TO:

This Section describes the requirements for erecting signs, mounting sign panels, relocating signs, and installing overhead street name signs.

612.02 MATERIALS

THE FOLLOWING IS DELETED FROM THE MATERIALS LIST.

THE SECOND PARAGRAPH IS DELETED.

612.03.02 Type GA Breakaway and Non-Breakaway Support Guide Signs

THE SUBPART HEADING IS CHANGED TO:

612.03.02 Type GA Breakaway Support Guide Signs

612.03.02 Type GA Breakaway Support Guide Signs

C. Constructing Pedestals

THE SUBPART IS CHANGED TO:

Place reinforcement steel as specified in 504.03.01 before placing the concrete. Ensure that concrete placement complies with the limitations as specified in 504.03.02.C. Place concrete as specified in 504.03.02.D. Cure concrete as specified in 504.03.02.F.

D. Erecting Posts

THE SUBPART IS CHANGED TO:

Erect posts as specified in 512.03.01.G.

THE FOLLOWING IS ADDED:

F. Constructing Anchor, Hinge, Bracket and Coupling Assemblies..At least 10 days before beginning the work, submit the manufacturer's installation guide and installer's certification to the RE.

Ensure that the installer is certified by the manufacturer.

Ensure that the manufacturer's representative is present during the foundation pour and the installation of the first sign. Install anchor, hinge, bracket and coupling assemblies according to the manufacturer's recommendations. The RE may require the system manufacturer's representative to be present at all times during the installation to provide on-site technical support.

THE FOLLOWING SUBSECTIONS ARE ADDED:

612.03.04 Relocate Sign

Relocate existing sign panels as shown on the plans. Clean dirt and debris from signs. Provide new steel "U" post sign supports as necessary. After mounting sign panels, notify the RE. The RE will examine the sign panels at night for glare. If directed by the RE, adjust the sign panels to eliminate glare.

612.03.05 Overhead Street Name Signs

Provide and install overhead street name signs on the traffic signal mast arm with all associated and necessary hardware in order to provide a complete installation in accordance with the NJDOT Standard Electrical Detail T-4507.

612.03.06 Specialized Sign

Provide and install Route 18 shields on the existing overhead and ground mounted advanced guide signs on Interstate 287 with all associated and necessary hardware in order to provide a complete installation. Submit the recommended mounting method to the RE for review and approval.

612.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEM IS DELETED:

ItemPay UnitGUIDE SIGN, TYPE GA, NON-BREAKAWAY SUPPORTSSQUARE FOOT

THE FOLLOWING ITEMS ARE ADDED:

ItemPay UnitRELOCATE SIGNUNITOVERHEAD STREET NAME SIGNSS.F.SPECIALIZED SIGNUNIT

THE FOLLOWING SECTION IS ADDED:

SECTION 613 – ARCHITECTURAL TREATMENTS

613.01 DESCRIPTION

This work shall consist of the construction of textured and colored formed concrete surfaces using simulated cut stone masonry formliners (Retaining Wall 1 and 3), simulated field stone masonry formliners (Retaining Wall 4), and color stain systems designed to duplicate closely the appearance of natural stone. This work shall also consist of the application of color stain to the smooth concrete faces as described herein and as shown on the plans.

This work shall also consist of the construction of Mock-up panels for evaluation by the Department. They shall be constructed at a site near the project and depict the appearance of textured and flat colored formed concrete surfaces as described herein. Mock-ups shall be constructed in accordance with the requirements set forth in these Specifications for the actual production work. Mock-ups that do not comply with the requirements for production work and that cannot be used to evaluate the patterning and coloration of the desired architectural effects, as noted herein, will be rejected and new mock-ups constructed at no additional cost to the Department.

Table 1				
Retaining	Location	Formliner	Fitzgerald Pattern Number	
Wall		Description	(or approved equal)	
1	Front Face	Random Cut Stone	17004, Liberty Island Stone	
			16" High Course	
1 & 3	Rear/Inside Face, on parapet	Random Cut Stone	17009, Liberty Island Stone	

	adjacent to sidewalk		12" High Course
4	Front Face	Field Stone	17915, Petaluma Fieldstone

The desired effect and appearance of the formliner configuration and surface texturing shall be as produced using a formliner with the same properties as those indicated in Table 1 above. The cut stone formliner surface texture should closely match the treatments depicted on the recently constructed walls and bridges on the Route 18, Section 2A project directly north of the Raritan River on Route 18, and the adjacent Route 18, Section 2F project. The fieldstone formliner surface texture should mimic the existing fieldstone retaining wall adjacent to RW4, which is to be removed. Patterning of simulated stone masonry shall appear natural and non-repeating seam lines or match lines caused from two or more formliners coming together shall not be apparent when viewing the completed wall. The coloration for staining the cut stone concrete surfaces, including the mortar joint simulations, shall closely match the appearance of the approved mock-ups. The colorations of the cut stone mock-ups will mimic those found on the NJ Transit/AMTRAK stone arch bridge at the northern end of the Route 18-2F project. The mock-up panels, when approved, will be the quality standard by which the production work for both the surface texture and the coloration will be judged. Each contractor shall view the existing structures mentioned above prior to preparing bids for this, and other related item of work associated with the architectural cut stone treatments.

The Contractor, when using the mock-ups or the Route 18, 2A/2F project as quality standards, will be expected to mimic the general appearance of the standard elements and shall not take advantage of any local defects that may compromise the appearance of the finished work.

Design and pattern of the cut stone and field stone shall be as specified and shall follow the manufacturer's formliner configuration for the specified pattern. Patterning shall appear natural and non-repeating. Minimum distances for repeating patterns shall be 30 feet horizontally and 10 feet vertically. Seam lines or match lines caused from two or more formliners coming together shall not be apparent when viewing the completed wall.

In order to achieve the desired results, there shall be only one brand and one supplier for all the stone formliner material. Similarly, one subcontractor shall be responsible for performing all the field staining operations or be responsible for training, instructing, and approving others to perform the work on his behalf.

Prior to performing any of the permanent/production work at Retaining Walls 1, 3, & 4, including ordering of the production formliner material, mock-up panels shall be produced for evaluation by the Department. Production work may not proceed until the mock-up panels are approved. Requirements for construction of, and payment for mock-up panels are described herein. In addition, final staining coloration will not be selected until approved coincident with the mock-ups. Staining materials shall not be ordered until approvals are obtained for the complete mock-up systems.

Value Engineering of the architectural treatments is not permitted. Treatments shall be a described herein and as shown on the plans.

613.02 MATERIALS

- 1. Formliners: Reusable, made of high-strength elastomeric materials, easily attachable to forms. Plastic or other non-durable forms are not permitted. Formliners shall be removable without causing deterioration of the surface or underlying concrete.
- 2. Release Agent: Compatible with simulated stone masonry formliners and with the coloring system as supplied by the form supplier for use by the contractor.
- 3. Form ties: Shall be made of either metal or fiberglass. Metal ties which result in a portion of the tie permanently embedded in the concrete shall be designed to separate at least one inch back from finished surface leaving only a neat hole that can be plugged with patching material. Contractor shall submit the type of form ties to the Department for approval prior to use in this work.

- 4. Color Stain: Penetrating stain shall achieve the same color variations throughout the project. Stain shall create a surface finish that is breathable (allowing water vapor transmission), and that resists deterioration from water, acid, alkali, fungi, sunlight or weathering. Stain mix shall be a water borne, low V.O.C. material, less than 289 grams/liter, and shall meet requirements for weathering resistance of 2000 hours accelerated exposure measured by weather-o-meter in accordance with ASTM g-23. Scrub test 1000 revolutions. Abrasive resistance (Tabor-CF-10) 500 cycles. Adhesion ASTM D-3359 1.00MM cross cuts on glass pass 3 or higher on a scale of 1 to 5. Supply information pertaining to chemical resistance ASTM D-1308 to 87.
- 5. Mortar Joints: Simulated mortar joints shall utilize a penetrating stain, as described above, colored to simulate the real mortar used in the natural stone veneer mock-ups and the actual stone veneer installations on the project.
- 6. Formliner Physical Properties shall be as follows:

A. Cut Stone Formliners:

Location: On retaining walls as shown on the Plans and as indicated above

Stone Size: 24" to 72" wide

Coursing: Inside Face (sidewalk side) of Parapets – 12"

All Others – 16" Maximum Relief: 1.625" Width of Grout: 0.75"

Details at joints, at edges of panels, and at plain concrete surface transitions, shall be constructed as

shown on the plans and as described in these specifications

B. Fieldstone Formliner:

Location: On retaining walls as shown on the Plans and as indicated above

Stone Size: 2" to 24" wide, 2" to 15" high

Maximum Relief: 1.5" Width of grout: 0.75"

Details at joints, at edges of panels, and at plain concrete surface transitions, shall be constructed as

shown on the plans and as described in these specifications

7. Federal Numbers of color stains will be established as the mock-ups are produced and approved for the production work. All color numbers will ultimately be based on "Federal Standard Colors", Federal Standard 595B.

613.03 QUALITY ASSURANCE

- Sample Panels and Formliners. Within 30 days of receiving the contract, the Contractor is required to submit samples of the simulated stone masonry formliners. The Samples are to demonstrate the finishes described herein. Approval of samples is required by the Department before the Mock-up work may begin. Samples need not be the elastomeric material required for the production formliners, but must be of a material that can be molded to accurately mimic the proposed textured surface. Samples for both the cut stone and field stone treatments shall be submitted for evaluation by the Department.
- 2. Liner Placement: The Contractor shall submit for each mock-up, a plan, elevation and details to show overall pattern, color treatments, joint locations, form tie locations, mortar straps and strap anchors, end, edge, and other special conditions shall be submitted in accordance with section 105.05.
- 3. Suppliers of formliners, as well as those selected for the concrete staining operations, shall have at least five years experience in delivering a complete system to the industry consisting of formliners, technical support, on site assistance, and coloring of the architectural surface.

4. Pre-Installation Meeting: Schedule conference with supplier, contractor, resident engineer, and the NJDOT Office of Landscape Architecture to assure understanding of simulated stone masonry formliner use, color application, requirements for construction of mock-up, and to coordinate the work.

613.04 WORKING DRAWINGS

- 1. Liner Placement Drawings: Plan, elevation and details to show overall pattern, color treatments, joint locations, form tie locations, end, edge, and other special conditions shall be submitted in accordance with section 105.05. Coloration shall be in accordance with the schemes shown on the approved mock-ups.
- 2. Form ties: A sample and description, showing method of separation when forms are removed.

613.05 PROJECT CONDITIONS

- 1. Environmental requirements: Apply color stain when ambient temperatures are Between 50 and 100 degrees F.
- 2. Consult manufacturer if conditions differ from this requirement. Schedule color stain application with earthwork and back-filling of any wall areas making sure that all simulated stone texture is colored to the minimum distance of 300 mm below grade.
- 3. Delay any adjacent plantings until color application is completed. Coordinate work to permit coloring applications without interference from other trades.

613.06 CONSTRUCTION

- 1. Mock-ups shall be constructed on site a minimum of sixty days before the production work starts and using the same materials, methods and work force that will be used for the project. Construct mock-ups as specified herein using the approved samples as the quality standard.
- 2. Size and Sequence of Mock-ups: Three different types of mock-up panels are required. Types and sizes are as described herein. Do not perform any staining of formliner surfaces until formliner pattern is approved and a coloration scheme is developed.
 - A. Mock-up No. 1 is to show the 16" high cut stone formliner treatment and stain used at Retaining Wall 1. Mock-up panel shall be a minimum of fifteen (15) feet wide and eight (8) feet high, and include a ten (10) inch high smooth concrete border at the top to simulate the look of Retaining Wall 1.
 - B. Mock-up No. 2 is to show the 12" high cut stone formliner treatment and stain used at Retaining Wall 1 & 3. Mock-up panel shall be a minimum of fifteen (15) feet wide and three and a half (3.5) feet high, and include a ten (10) inch high smooth concrete surface at the top to simulate the look of Retaining Wall 1 & 3.
 - C. Mock-up No. 3 is to show the field stone formliner treatment and stain used at Retaining Wall 4. Mock-up panel shall be a minimum of fifteen (15) feet wide and eight (8) feet high, and include a four (4) inch high smooth concrete border at the top to simulate the look of Retaining Wall 4.
- 3. All mock-up panels shall include areas to demonstrate formliner butt joint and continuation of pattern through expansion and construction joints.

- 4. After concrete work on mock-up is completed and cured for a minimum of 28 days, and after the surface is determined to be acceptable for coloring, apply color stain.
- 5. After coloring demonstrated on the mock-ups is determined to be acceptable by the Department, construction production work on the project may proceed, using mock-up as quality standard. All surfaces with the same treatments depicted on the mock-ups shall meet the same quality standards that are present on the mock-up.
- 6. Foundations and other means and methods to support and stabilize the mock-ups are the responsibility of the Contractor.
- 7. Special Techniques Forming Textured Concrete
 - A. Formliner preparation: Clean and make free of buildup prior to each pour. Inspect for blemishes or tears. Repair if needed following supplier's recommendations.
 - B. Formliner attachments: Place formliners in accordance with liner placement drawings. Butt liner joints as tightly as practical, to prevent leakage between abutting liners. Attach formliners to forms securely following supplier's recommendations. Liner joints and other concrete contraction and expansion joints shall not be easily visible. Seams and joints shall be placed so that the architectural finish will be unbroken and continuous. Expansion joint material shall be stopped 1/2 inch from the surface and permanent caulking, shaped to the contours of the adjacent surfaces, shall be applied to fill the opening. If the pattern selected has formliners connecting through the middle of the stones, carefully remove the seam line created by abutting molds. Match the texture and shape of the surrounding stone, avoiding visible seams or mold marks. Joints shall be masked in the simulated mortar joints or by matching surface contouring through the joints. Normal chamfering of concrete edges at joints will not be permitted. Special care is required to avoid spalling or other damage to the concrete surface during form removal operations.
 - C. Form release agent: Apply following supplier's recommendations.
 - D. Form stripping and related construction shall avoid creating defects in finished surface. Any defects shall be corrected by the contractor. Surface voids and other defects larger than six (6) square inches shall be rubbed with burlap and grout to provide a smooth, clean surface.
 - E. Place form ties at thinnest points of formliners (high points of finished wall). Neatly patch the hole remaining after disengaging the protruding portion of the tie so that it will not be visible after coloring the concrete surface.
 - F. The supplier of the formliner will have a minimum of five years experience in furnishing formliners, liner placement drawings, and technical assistance to the Contractor.
- 8. Special Techniques Applying Color Stain System to Simulated Stone Surfaces:
 - A. Stain shall be applied by an experienced skilled craftsman with a minimum of five years direct experience in the same type of work.
 - B. All concrete surfaces that are to be stained and any patching that has been done in these areas shall be at least 28 days old.
 - C. Clean surface prior to application of stain material to assure that surface is free of latency, dirt, dust, grease, efflorescence, paint, or other foreign material, following supplier's instructions for surface preparation. Do not sand blast. Preferred method to remove latency is pressure washing with water. Completed surface shall be free of blemishes, discoloration, surface voids and unnatural form marks.

- D. The base color of stain shall be applied to the simulated stone surface.
- E. Accent colors shall be applied to individual stones as shown on the Liner Placement Drawings.
- F. Highlight colors shall be applied by "hand wiping".
- G. Mortar lines shall be colored as determined from mock-ups.
- H. Where exposed soil or pavement is adjacent to the textured surface, which may splatter dirt or soil from rainfall or where surface may be subject to over spray from other processes, provide temporary cover of completed work.
- 9. Applying Color Stain to Plain Concrete Surfaces:
 - A. The staining of plain concrete surfaces used in production work shall be of the coloration(s) approved on the mock-ups.
 - B. The desired effects shall be accomplished with one coat of penetrating stain.
 - C. Pertinent requirements listed above for the simulated stone surfaces shall also apply.

613.07 METHOD OF MEASUREMENT

Architectural Surface Treatment will not be measured for payment. Cost associated with the architectural surface treatment, including the mock-up panels, will be included in the square footage cost for each applicable retaining wall.

613.08 BASIS OF PAYMENT

Payment will be made in accordance with section 513 (Retaining Walls) under:

ITEM	PAYUNIT
RETAINING WALL, CAST-IN-PLACE, LOCATION NO	SQUARE FOOT
RETAINING WALL, LOCATION NO.	SQUARE FOOT

Payment will include all work required to provide the Architectural Treatment as described herein and as shown on the Plans. It includes supplying the formliners and color stain, preparing the concrete surface for staining, applying the stain, and any other incidental work described herein or as required to provide the desired architectural effects. It includes the staining on all surfaces scheduled for staining as shown on the plans and as described herein. It also includes the construction of the mock-up panels.

DIVISION 650 – UTILITIES

SECTION 651 – WATER

651.03 CONSTRUCTION

651.03.01 Water Pipe

B. Existing Utilities and Structures.

THE FOLLOWING IS ADDED TO THIS SUBPART:

Cap blowoff such that above grade elbow shall be removed, and the pipe cut and capped so that the top of blowoff shall be flush with final grade of surrounding ground.

THE FOLLOWING NEW SUBPART IS ADDED:

651.03.09 Reset Water Manhole

Water manhole shall be reset as specified in 602.03.03.

651.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEMS ARE ADDED:

ITEM RESET WATER MANHOLE PAY UNIT UNIT

SECTION 652 – SANITARY SEWERS

652.03 CONSTRUCTION

652.03.01 Sewer Pipe

F. Thrust Blocks.

THE THIRD SENTENCE IS CHANGED TO:

Ensure that thrust blocks do not come in contact with other utilities or structures without the approval of the RE.

H. Sewer Pipe Testing.

1. Gravity Main Sewer Testing.

652.03.06 Reconstruct Sanitary Sewer Manhole

THE FOLLOWING IS ADDED TO THIS SUBPART:

Sanitary sewer manholes shall be reconstructed when modifying greater than 5 inches.

652.03.07 Reset Sanitary Sewer Manhole

THE FOLLOWING IS ADDED TO THIS SUBPART:

Sanitary sewer manholes shall be reset when modifying 5 inches or less.

SECTION 653 - GAS

653.03.01 Gas Main

A. Prequalification.

List of pre-qualified subcontractors is as follows:

Colonnelli Bros., Inc.	Nino Colonnelli	(201) 440-1118
J. Fletcher Creamer & Sons	Jorge Pires	(908) 925-3200
Diclemente Contractors	Andy Diclemente	(201) 319-0900
Elk/Crown Pipeline Construction Company	Bob Williams	(856) 694-9200
Henkels & McCoy	Ken Carmelia	(609) 387-9000
J.F. Kiely Construction Co.	Jim Pagano	(732) 222-4400
Kemsco Construction Inc.	Ralph Serpe	(973) 733-2255
Lantier Construction Co.	Bill Phillips	(973) 628-9302
Miller Pipeline Corp.	Greg.Ritsick	(484) 256-4619
Napp Grecco Company	Joseph Napp	(973) 482-3500
Roman E&G Corp.	Michael Lamorgese	(973) 482-1113
Joseph M. Sanzari, Inc.	Rich Egan	(201) 538-6615
Skoda Contracting	Barry Stelmack	(800) 507-9601
Waters & Bugbee, Inc.	Dennis Brophy	(609) 584-1100

B. Scheduling Work.

THE FOLLOWING IS ADDED TO THIS SUBPART:

Along Route 18 SB (Hoes Lane) between Sta. 2480+80 LT and Sta. 2486+70 LT install the 24-inch RCP storm drain prior to installing the 12-inch gas main.

C. Handling and Storing.

E. Excavating.

THE FOLLOWING IS ADDED TO THIS SUBPART:

Prior to excavating in the vicinity of existing gas mains being designated as abandoned on the Plans, request testing of the main by PSE&G and obtain confirmation of abandonment.

J. Air-Pressure Test.

653.03.03 Gas Service Connection

THE FOLLOWING IS ADDED TO THIS SUBPART:

After installation of new gas mains, Contractor shall contact PSE&G to schedule connections to existing gas facilities by personnel of PSE&G.

THE FOLLOWING IS ADDED TO THIS DIVISION:

SECTION 654 – UTILITY MANHOLES AND DUCT BANKS

654.01 DESCRIPTION

This section describes the requirements for constructing concrete encased duct banks, manholes, and risers.

654.02 MATERIALS

Provide materials as specified:

Concrete shall have a minimum compressive strength of 4000 psi in 28 days.

All reinforcing bars shall be new billet steel, deformed bars conforming to ASTM A615, Grade 60.

Plastic Conduit Spacers shall be Carlon snap-lock type or approved equal and shall conform to PS class / code 08-6712 for base spacers and PS class / code 08-6713 for inner conduit.

654.03 CONSTRUCTION

654.03.01 Duct Banks and Electric Risers

Install the concrete encased conduit duct banks according to the details and dimensions shown on the contract drawings. The concrete used for conduit encasement shall have a minimum compressive strength of 1500 psi after 28 days.

a. Construct electric risers per PSE&G drawing XXXXXXXX (see Attachment C - PSE&G Electrical Details of these Special Provisions).

Conduit and associated materials shall conform to the requirements of NEMA TC-6, type DB. No steel conduit will be permitted.

Encase the conduit duct bank in concrete with a 3-inch envelope on all sides and 1 1/2-inch of concrete separation between conduits. Pour the concrete to give monolithic construction and be well spaded to prevent voids between the individual conduits. No outside forms other than sheeting are required during conduit construction. Support multiple ducts by preformed non-metallic separators. No metallic ties or spacers shall be used. No metal parts shall be used in any way which would form a magnetic loop.

The ground cover over the conduit will be a minimum of 3 feet from finished grade to top of concrete in the conduit system.

Rod all completed conduit runs for cleanliness and to check corresponding entrances in manholes. Clean conduit with a wire brush slightly larger than the duct and a flexible mandrel at least 12 inches long and 1/4 inch less in diameter than the inside diameter of the duct. Supply polypropylene rope (3/16 inch) and install in all ducts. Install a measuring tape in lieu of the rope in one duct of a multiple conduit line.

On all through conduit lines, the transfiguration of conduits shall be in accordance with the plans. Any deviation to these standards must be approved by the Utility and must be noted on the as-built notes.

Where the line of a conduit changes direction horizontally, only use conduit segments with a minimum of 12.5 foot radius.

Backfilling of trenches may start immediately after pouring concrete, provided the concrete is covered with heavy paper. Use a 12-inch layer of clean fill, free of stones, directly over the duct bank before tamping is started. Thoroughly tamp all subsequent backfill in 6-inch layers with pneumatic tamping tools.

Install riser pipes to poles as shown in the contract documents. Risers shall enter the manholes at locations shown in the details or as directed by the utility company and shall be placed on the side of the pole indicated. The material for riser pipes shall normally be schedule 40, P.V.C. conduit type TC-2. Horizontal sweeps shall have a radius no less than 12.5 feet. Install vertical 90 degree bends of 4-foot radius at the base of the pole.

Weld joints between sections of steel casing for the entire circumference of each joint. This weld shall consist of a minimum of two passes. Bevel welded joints prior to welding.

The conduit system is to be inspected and approved by a designated representative of PSE&G. PSE&G is not obligated to provide an inspector on the job at all times. It is the contractor's responsibility to contact PSE&G concerning inspection times and work progress. Inspection and approval shall include the following:

- a. Preparation of excavation for all work.
- b. Spacing and location of conduits and neutral wire in trench.
- c. Straightness and levelness of conduit duct bank.
- d. Concrete placement and backfilling operations.

Acceptance of ownership of the complete conduit and manhole system by PSE&G will be conditioned upon PSE&G's ability to properly install its required equipment in the system.

Restore all grass, sidewalk, curbs and pavement areas disturbed by the construction of duct banks at no additional cost. Excavation shall be in accordance with Subsection 202.03. Backfilling shall be in accordance with Subsection 203.03.

Temporarily support utility poles during duct bank construction as deemed necessary by PSE&G.

All work for PSE&G shall be performed by a contractor pre-approved by PSE&G and pre-qualified by the Department. A listing of PSE&G approved contractors appears below:

J.F. Creamer & Son, Inc.	Ted Pailwoda	(908) 986-5717
Roman E&G Corp.	Michael Lamorgese	(973) 482-1113
Henkels & McCoy, Inc.	Dennis Palermo	(609) 387-9000
Kemsco Construction, Inc.	Ralph Serpe	(973) 733-2255

654.03.02 Electrical Manhole

Manhole loading shall be in accordance with AASHTO H-20 Highway Bridge Loading requirements.

- a. Provide and construct electric manholes per PSE&G drawings located in Attachment C PSE&G Details of these Special Provisions).
- b. For precast and field poured manholes, fabricator's fully dimensioned and detailed drawings showing the design loading and location of duct windows and pulling irons must be approved by PSE&G.

Excavate test holes for manholes in advance of manhole installation.

Excavation shall be of a sufficient size to allow a minimum of 6 inches between the manhole wall or manhole appurtenances to face of walers, plus allowance for sheeting and walers. Determine the depth of excavation by the size of the manhole, plus 6 inches of compacted stone, gravel or sand (for leveling), plus an allowance to provide a normal 24 inch neck. Do not install manholes with less than 12 inches between final grade and top of the roof.

After pouring the manhole floor, setting the forms for walls and roof and attaching the conduit entrance forms, pour the manhole monolithically. Vibrate concrete during pouring to prevent voids. Immediately after the forms are removed, fill any honeycomb or voids which appear with grout.

Notify PSE&G 48 hours in advanced of placing manholes. Manholes are to be inspected and approved by a designated representative of PSE&G. PSE&G is not obligated to provide an inspector on the job at all times. It is the contractor's responsibility to contact PSE&G concerning inspection times and work progress. Inspection and approval shall include the following:

- a. Preparation of excavation for all work.
- b. Proper location and placing of manholes.
- c. Backfilling operations.

Acceptance of ownership of the complete conduit and manhole system by PSE&G will be conditioned upon PSE&G's ability to properly install its required equipment in the system.

Restore all grass, sidewalk and pavement areas disturbed by the construction of manholes.

All materials required for the construction of electrical manholes including precast manholes, frames and covers shall be supplied by a vendor pre-approved by PSE&G. A listing of approved vendors appears below:

IKG Industries (Frames and Covers)

270 Terminal Avenue

Clark, NJ (908) 815-9500

Campbell Foundry (Frames and Covers)

800 Bergen Street Harrison, NJ (973) 483-5480

Rotondo / Penn Cast Products (Precast Manholes)

514 Township Line Road

P.O. Box 210 Telford, PA (215) 257-8081

A.C. Miller Concrete Products (Precast Manholes)

P.O. Box 199 Bridge Street Spring City, PA (610) 948-4600

All work for PSE&G shall be performed by a contractor pre-approved by PSE&G and pre-qualified by the Department. A listing of PSE&G approved contractors appears below:

J.F. Creamer & Son, Inc.	Ted Pailwoda	(908) 986-5717
Roman E&G Corp.	Michael Lamorgese	(973) 482-1113
Henkels & McCoy, Inc.	Dennis Palermo	(609) 387-9000
Kemsco Construction, Inc.	Ralph Serpe	(973) 733-2255

Contractor shall maintain the appropriate vertical clearance between construction equipment and overhead power lines as prescribed by the National Electrical Safety Code during the installation of utility structures.

654.04 MEASUREMENT AND PAYMENT

The Department will measure and make payment for Items as follows:

PAY ITEM
CONCRETE ENCASED DUCT BANK
PAY UNIT
LINEAR FOOT

LINEAR FOOT LINEAR FOOT UNIT UNIT

CONCRETE ENCASED DUCT BANK will be measured by the linear foot of each conduit within the concrete encasement.

THE FOLLOWING IS ADDED TO THIS DIVISION:

SECTION 655 - TELECOMMUNICATIONS

655.01 DESCRIPTION

This section describes the requirements for constructing concrete encased telecommunications duct banks and telecommunication manholes.

655.02 MATERIALS

Provide materials as specified:

655.03 CONSTRUCTION

655.03.01 Concrete Encased Telecommunication Conduit

Install the concrete encased conduit duct banks according to the details and dimensions shown on the contract drawings. The concrete used for conduit encasement shall have a minimum compressive strength of 1500 psi after 28 days.

Conduit and associated materials shall conform to the requirements of NEMA TC-6, type DB. No steel conduit will be permitted.

Encase the conduit duct bank shall in concrete with a 3-inch envelope on all sides and 1 1/2-inch of concrete separation between conduits. Pour the concrete to give monolithic construction and be well spaded to prevent voids between the individual conduits. No outside forms other than sheeting are required during conduit construction. Support multiple ducts by preformed non-metallic separators. No metallic ties or spacers shall be used. No metal parts shall be used in any way which would form a magnetic loop.

The ground cover over the conduit will be a minimum of 3 feet from finished grade to top of concrete in the conduit system.

Rod all completed conduit runs for cleanliness and to check corresponding entrances in manholes. Clean conduit with a wire brush slightly larger than the duct and a flexible mandrel at least 12 inches long and 1/4 inch less in diameter than the inside diameter of the duct. Supply polypropylene rope (3/16 inch) and install in all ducts. Install a measuring in lieu of the rope in one duct of a multiple conduit line.

On all through conduit lines, the transfiguration of conduits shall be in accordance with the plans. Any deviation to these standards must be approved by the Utility and must be noted on the as-built notes.

Where the line of a conduit changes direction horizontally, only use conduit segments with a minimum of 12.5 foot radius.

Backfilling of trenches may start immediately after pouring concrete, provided the concrete is covered with heavy paper. Use a 12-inch layer of clean fill, free of stones, directly over the duct bank before tamping is started. Thoroughly tamp all subsequent backfill in 6-inch layers with pneumatic tamping tools.

Install riser pipes to poles as shown in the contract documents. Risers shall enter the manholes at locations shown in the details or as directed by the utility company and shall be placed on the side of the pole indicated. The material for riser pipes shall normally be schedule 40, P.V.C. conduit type TC-2. Horizontal sweeps shall have a radius no less than 12.5 feet. Install vertical 90 degree bends of 4-foot radius at the base of the pole.

Weld joints between sections of steel casing for the entire circumference of each joint. This weld shall consist of a minimum of two passes. Bevel welded joints prior to welding.

Restore all grass, sidewalk, curbs and pavement areas disturbed by the construction of duct banks at no additional cost. Excavation shall be in accordance with Subsection 202.03. Backfilling shall be in accordance with Subsection 203.03.

655.03.02 Telecommunication Manhole

Excavate as specified in 203.03.03. Obtain RE approval before finishing excavating. If the RE determines that the bottom is unstable, undercut, backfill, and compact as directed by the RE.

Provide and construct fiber manholes per Verizon Business Solutions (MCI) drawings located in Attachment B - Verizon Business Solutions (MCI) Details of these Special Provisions.

Place a 12 inch bed of compacted coarse aggregate. Construct the manhole as specified in 504.03.02. Ensure the walls of the manhole are constructed monolithically. The Contractor may use a precast concrete manhole. If modifications to the precast concrete manhole are required, obtain RE approval before installation.

Install ground rod and clamp.

Backfill and compact using the directed method as specified in 203.03.02C.

Set casting in mortar bed. Set the manhole cover. If the manhole cover is loose or wobbles, grind to obtain a tight fit.

Restore the area disturbed by the work to the original condition, including replacement of grass, sidewalk and pavement areas.

655.03.02 Telecommunication Riser

Construct telecommunication risers according to construction details in the Plans.

Install riser pipes to poles as shown in the contract documents. Risers shall enter the manholes at locations shown in the details or as directed by the utility company and shall be placed on the side of the pole indicated. The material for riser pipes shall normally be schedule 40, P.V.C. conduit type TC-2. Horizontal sweeps shall have a radius no less than 12.5 feet. Install vertical 90 degree bends of 4-foot radius at the base of the pole.

655.04 MEASUREMENT AND PAYMENT

The Department will measure and make payment for Items as follows:

PAY ITEM
CONCRETE ENCASED TELECOMMUNICATION CONDUIT
TELECOMMUNICATION MANHOLE
TELECOMMUNICATION RISER

PAY UNIT LINEAR FOOT UNIT UNIT

CONCRETE ENCASED TELECOMMUNICATION CONDUIT will be measured by the linear foot of each conduit within the concrete encasement.

THE FOLLOWING IS ADDED TO THIS DIVISION:

SECTION 656 - CABLE

656.01 DESCRIPTION

This section describes the requirements for constructing cable manholes, handholes, and risers.

656.02 MATERIALS

Provide materials as specified:

Aggregate for Coarse Aggregate Bed	Subsection 901.03
Mortar and Grout.	
Rigid Nonmetallic Conduit.	918.01
Concrete shall have a minimum compressive strength of 4000 psi in 28 da	
All reinforcing bars shall be new billet steel, deformed bars conforming to	

656.03 CONSTRUCTION

656.03.01 Cable Manhole and Cable Handhole

Manhole loading shall be in accordance with AASHTO H-20 Highway Bridge Loading requirements.

a. Provide and construct cable manholes per Cablevision drawings located in Attachment A – Cablevision Details of these Special Provisions). Cable manhole shall measure 4 feet by 4 feet by 4 feet with a 30-inch diameter manhole frame and cover having "CABLEVISION" cast onto the cover. Provide cable irons and cable racking on all sides. Provide sump recesswith grate. Provide 1000-lb pull string through conduit tied off to pulling irons.

Excavate test holes for manholes in advance of manhole installation.

Excavation shall be of a sufficient size to allow a minimum of 6 inches between the manhole wall or manhole appurtenances to face of walers, plus allowance for sheeting and walers. The depth of excavation shall be determined by the size of the manhole, plus 6 inches of compacted stone, gravel or sand (for leveling), plus an allowance to provide a normal 24 inch neck. Do not install manholes with less than 12 inches between final grade and top of the roof.

After pouring the manhole floor, setting the forms for walls and roof and attaching the conduit entrance forms, pour the manhole monolithically. Vibrate concrete during pouring to prevent voids. Immediately after the forms are removed, fill any honeycomb or voids which appear with grout.

Restore all grass, sidewalk and pavement areas disturbed by the construction of manholes.

Contractor shall maintain the appropriate vertical clearance between construction equipment and overhead power lines as prescribed by the National Electrical Safety Code during the installation of utility structures.

656.03.02 Cable Riser

Construct cable risers according to construction details in the Plans.

Install riser pipes to poles as shown in the contract documents. Risers shall enter the manholes at locations shown in the details or as directed by the utility company and shall be placed on the side of the pole indicated. The material for riser pipes shall normally be schedule 40, P.V.C. conduit type TC-2. Horizontal sweeps shall have a radius no less than 12.5 feet. Install vertical 90 degree bends of 4-foot radius at the base of the pole.

656.04 MEASUREMENT AND PAYMENT

The Department will measure and make payment for Items as follows:

ITEM	PAY UNIT
CABLE RISER	UNIT
CABLE MANHOLE	UNIT
CABLE HANDHOLE	UNIT

DIVISION 700 – ELECTRICAL

SECTION 701 – GENERAL ITEMS

701.02.01 Materials THE FOLLOWING IS ADDED:

Foundations Type SFT Modified are units which shall conform to PSE&G specifications. All concrete, excavation, forms, anchor bolts, clamps, ground rods, and all other hardware necessary for a complete installation shall be included in the price of the this pay item. Item shall be constructed with the materials indicated on the contract documents. Bolt circle of foundation shall be compatible with lighting standard decorative.

Do not use aluminum conduit for rigid metallic conduit on structures.

701.03.01 Existing Systems

Deliver and unload salvaged materials to:

Bureau of Electrical Maintenance, Central Region 100 Daniels Way Freehold, NJ 07728-2668 Telephone: 732-625-4350

THE FOLLOWING IS ADDED:

If new cable or wire is designated to be installed into existing conduit systems, clean and swab the conduit system prior to installing the cable or wire. After cleaning, test each conduit by pulling through a metal ball with a diameter at least 85 percent of the nominal inside diameter of the conduit to ensure the conduit is free of any obstruction or foreign material. If the ball fails to pass through the conduit, repair or replace the defective conduit as directed by the RE. Restore disturbed areas to original condition.

701.03.05 Rigid Nonmetallic Conduit

B. Installation.

THE LAST PARAGRAPH IS CHANGED TO:

Install true tape marked in 1 foot increments for the length of the rigid non-metallic conduit. Install a tracer wire continuously for the entire run of 1 of the conduits, including through the junction boxes mounted on the wall. Splice the tracer wire only in the junction boxes. Seal the rigid nonmetallic conduit with the tracer wire. If wire or cable is not scheduled to be installed within the next 6 months, cap and seal the other conduits leaving the true tape inside. Install marking tape in the trench above the conduit.

701.03.07 Flexible Nonmetallic Conduit

B. Installation.

THE SECOND PARAGRAPH IS CHANGED TO:

Terminate flexible nonmetallic conduit according to manufacturer's recommendations.

THE LAST PARAGRAPH IS CHANGED TO:

Install true tape marked in 1-foot increments for the length of the flexible non-metallic conduit. Install a tracer wire continuously for the entire run of conduit, including through the junction boxes, mounting it on the wall. Splice the tracer wire only in the junction box. Seal the ends of flexible nonmetallic conduit carrying the tracer wire. If wire or cable is not scheduled to be installed within 6 months of conduit installation, cap and seal the other conduits leaving the true tape inside. Install marking tape in the trench above the conduit.

701.03.15 Cable and Wire

A. Installing.

THE FOLLOWING IS ADDED

Test the existing tracer wire in the conduit for continuity. If there is no existing tracer wire in any of the conduits in the same trench, then install a continuous tracer wire between the adjacent junction boxes without any splice when installing the cable and wire as directed by the RE.

C. Connection and Coordination with Utility Services.

THE FOLLOWING IS ADDED TO THE FOURTH PARAGRAPH:

At Substantial Completion provide the RE with a letter requesting transfer of utility services providing the latest copy of the utility bill from each utility company. Such transfers are to be effective beginning the next monthly billing cycle after Substantial Completion or as directed by the RE.

701.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEMS ARE ADDED:

Item
FOUNDATION TYPE SFT MODIFIED
3" RIGID METALLIC CONDUIT ON STRUCTURE

Pay Unit UNIT LINEAR FOOT

THE FOLLOWING IS ADDED:

If restoration of disturbed areas includes pavement, curb, sidewalk, driveway or island, the Department will make payment for such work as specified in 104.03.03.

When an existing conduit is found to be defective, the RE may direct the Contractor to install a new conduit or may direct the Contractor to repair the existing defective conduit. When the RE directs the installation of a new conduit or a repair to the defective conduit, the Department will make payment for this work as specified in 104.03.03.

When the RE directs the Contractor to install a tracer wire in existing conduit, the Department will make payment for this work as specified in 104.03.03.

SECTION 702 – TRAFFIC SIGNALS

702.03 CONSTRUCTION

THE FOLLOWING IS ADDED:

After placing a new, temporary or interim traffic signal system into operation, inspect the traffic signal system every 2 months. Fill out a Contractor Maintenance Traffic Signal Inspection Report (Form EL-16C) when the traffic signal system becomes operational, when the traffic signal system is modified, and at every 2-month inspection.

Maintain as-built drawings of each signal modification. Place copies of the as-built drawings for each traffic signal system modification, Forms EL-16C, and Forms EL-11C in a plastic pocket mounted inside the cabinet door of each controller cabinet. Also provide a copy of all forms and as-built drawings to the RE.

If a new, temporary or interim traffic signal system fails or becomes damaged, repair and restore the traffic signal system to normal operation. Begin repair of the traffic signal system within 2 hours of receiving notice of damage or malfunction from the Department, State police, or local authorities. Ensure that workers assigned to such repair work continuously until the traffic signal resumes normal signal operation.

For each response to a system failure or damage, fill out a Contractor Maintenance Emergency Call Record (Form EL-11C) and place it in a plastic pocket mounted inside the cabinet door of each controller cabinet.

If the Contractor fails to respond to a failure or damage notification and begin work within 2 hours of notification, or does not continue to work until the traffic signal system resumes normal operation, the Department, in the interest of safety, will respond with its own forces to restore normal operation. If the Department mobilizes its forces to effect repairs, the Contractor agrees to pay the Department a sum of \$3000 for costs of mobilizing its forces and equipment. In addition, the Contractor must pay the Department the actual cost of material used for the repair and pay the actual costs of police traffic protection.

702.03.01 Controller

THE FOLLOWING IS ADDED:

Mount the controller cabinet on a 24-inch aluminum skirt with adjustable shelves. The skirt and controller cabinet must have the same manufacturer.

Install an uninterruptable power source (UPS) unit in all controller cabinets conforming to the following criteria:

- 1. All interconnecting harnesses are heavy duty with military type connectors.
- 2. The UPS unit runs the intersection on flash mode for a minimum of two hours at 600 watts.
- 3. A warranty for a minimum of two years.
- 4. Install a Clary SP 1000 Traffic UPS system or approved equal.

Shelf-mount the UPS unit and battery pack on the side wall of the controller cabinet skirt.

Submit catalog cuts and provide a fully wired cabinet for review and acceptance by the Department before final approval is given to proceed with the installation.

702.03.03 Traffic Signal Mast Arm

THE FOLLOWING IS ADDED:

Include complete structural design calculations signed and sealed by a New Jersey Professional Engineer.

702.03.05 Traffic Signal Head

THE FOLLOWING IS ADDED:

The Dynamic Red Signal Ahead Sign assembly includes the "Red Signal Ahead" fiber optic sign, mounting hardware, traffic signal cable from the terminal block of the sign to the base of the signal standard and all associated and necessary hardware in order to provide a complete installation in accordance with the NJDOT Standard Electrical Detail T-1407.

702.03.11 Temporary and Interim Traffic Signal Systems

THE FIRST THROUGH FIFTH PARAGRAPHS ARE DELETED:

702.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEM IS ADDED:

Item
DYNAMIC RED SIGNAL AHEAD SIGN ASSEMBLY

Pay Unit UNIT

SECTION 703 – HIGHWAY LIGHTING

703.02.01 Materials THE FOLLOWING IS ADDED:

Lighting Standard Decorative are 6000-T5 Aluminum Alloy poles comprised of a 5" outside diameter flat fluted shaft with a 3" outside diameter tenon. Required pole heights are indicated on the contract drawings. Base shall be provided with an access cover and a bolt circle of 8"-12". Style of pole shall match lighting standards installed along Route 18 SB (Hoes Lane) MUP or shall be an approved equal.

Luminaire Decorative are units which shall be comprised of a 3" inside diameter slip fitter, photocontrol button eye, globe holder constructed of cast aluminum #356HM alloy, a refractor globe with a prismatic acrylic lens and type V optics, a die cast aluminum #360 alloy cage assembly, a spun aluminum roof, and a cast aluminum #356HM alloy finial. See contract documents for details. Lamps shall be high pressure sodium with wattages as indicated on contract documents.

All poles, luminaires, exposed conduit, junction boxes and attachment hardware associated with the pedestrian bridges shall have a black finish.

703.03 CONSTRUCTION

THE FOLLOWING IS ADDED:

Maintain up-to-date as-built drawings of the highway lighting system and temporary highway lighting system. Place copies of the as-built drawings in a plastic pocket mounted inside the meter cabinet, and provide a copy to the RE

If the highway lighting system or temporary highway lighting system fails or becomes damaged, repair and restore the system to normal operation. Begin repair of the signal system within 2 hours of receiving notice of damage or malfunction from the Department, State police, or local authorities. Ensure workers assigned to such repair work continuously until the lighting system is restored to normal operation.

For each response to a system failure or damage, fill out a Contractor Maintenance Emergency Call Record (Form EL-11C) and place it in a plastic pocket mounted inside the cabinet door of each controller cabinet.

If the Contractor fails to respond to a failure or damage notification and begin work within 2 hours of notification, or does not continue to work until the lighting system is restored to normal operation, the Department, in the interest of safety, will respond with its own forces to restore normal operation. If the Department mobilizes its forces to effect repairs, the Contractor agrees to pay the Department a sum of \$3000 for costs of mobilizing its forces and equipment. In addition, the Contractor must pay the Department the actual cost of material used for the repair and pay the actual costs of police traffic protection.

703.03.07 Temporary Highway Lighting System

The Contractor must design the Temporary lighting system at the following locations and as directed by the RE:

- 1. Intersection of Route 18 (Hoes Lane) and Morris Avenue (Stage 1A)
- 2. Intersection of Route 18 (Hoes Lane) and Skiles Avenue (Stage 1A)
- 3. Intersection of Route 18 (Hoes Lane) and Sidney Road (Stage 1A)
- 4. Intersection of Route 18 (Hoes Lane) and Telcordia Drive (Stage 1A)
- 5. Intersection of Route 18 (Hoes Lane) and Behmer Road (Stage 1A)
- 6. Intersection of Route 18 (Hoes Lane) and Centennial Avenue (Stage 2)
- 7. Intersection of Route 18 (Centennial Avenue) and Route 18 (Possumtown Road) (Stage 2)
- 8. Intersection of Route 18 (Centennial Avenue) and Knightsbridge Road (Stage 1A)

Deliver and unload salvaged materials to:

Bureau of Electrical Maintenance, Central Region 100 Daniels Way Freehold, NJ 07728-2668

Telephone: 732-625-4350 THE SIXTH PARAGRAPH IS DELETED:

THE EIGHTH THROUGH TENTH PARAGRAPHS ARE DELETED:

703.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEMS ARE ADDED:

Item
LIGHTING STANDARD DECORATIVE
LUMINAIRE DECORATIVE

Pay Unit UNIT UNIT

SECTION 704 – INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

704.02.01 Materials

THE FOLLOWING MATERIALS ARE ADDED:

CCTV Camera	918.30
Digital Video Encoder	918.31
Ethernet Network Switch	918.32
Environmental Field Terminal Cabinet	918.33
Patch Panels	918.34
Fiber Optic Fusion Splice and Splice Enclosure	918.35
Splicing Into Existing Network Circuit	918.36
Installation and Terminations of Fiber Optic Cable	
Fiber Optic Cable - Single Mode, Loose Tube, Single Jacket	918.38
Fiber Optic Cable - Single Mode, Loose Tube, Termination	
Fiber Optic Cable Connectors Type ST	
Communication Hub Modifications	918.41
ITS Modifications to TOC	918.42

FIFTH PARAGRAPH IS CHANGED TO:

Submit catalog cut sheets of the ITS and electrical material specified components along with the system working drawings, in a complete package for approval. The complete package of the system working drawings includes but is not limited to the ITS System Block Diagrams, Fiber Assignment Diagrams, and Rack/Cabinet Equipment Layout Diagrams; Electrical material catalog cut sheets, Certified Structural Details & Calculations. All components must be approved in the system working drawings before use on the Contract. Submit structural components separately for structural review and approval with the required certification and include a copy of all approvals when submitting the system working drawings to meet the complete package requirement.

THE FIRST SENTENCE OF THE LAST PARAGRAPH IS CHANGED TO:

For materials furnished and installed, provide a minimum 2-year warranty from the latter date of Substantial Completion and Successful ITS System Testing against any imperfections in workmanship, components and materials.

704.03.01 General System (GS)

B. Installation.

THE FOLLOWING IS ADDED TO THE FIRST PARAGRAPH:

When installing a new system or modifying an existing system, ensure the respective manufacturer certified field representative of ITS components and related equipment is on site to put the equipment into operation.

Coordinate with the Department for exact timeframes of existing system shutdowns for work at the Traffic Operations Center North. For each half hour the work extends beyond those time frames, the Department will assess liquidated damages of \$500 per half hour.

1. Junction Box ITS.

THE ENTIRE TEXT IS CHANGED TO:

- **a. Installation.** Excavate as specified in 202.03.02. Install junction boxes only in areas where the slope is not less than 22H: 1V. Place junction boxes on 10 inches of coarse aggregate No. 57. With each junction box, provide 6 coiling brackets, inserts and fasteners, and a ground rod and clamp. A ground rod is only required for locations where electrically conductive material is present. Backfill and compact using the directed method as specified in 203.03.02.D. Restore disturbed areas to the original conditions, the conditions specified in the Contract, or as directed by the RE.
- b. Relocation. Submit plans showing the proposed method of relocation of junction box including any provisions for maintaining network operation and/or cut-over during the process to the RE for approval. Remove existing ITS junction box by excavating around the junction box, cutting back conduits, pulling the cable slack equally to adjacent junction boxes and notching the portion of junction box below the conduits sufficient to slide the fiber optic cable. After removal of the junction box, re-couple the conduit(s), and terminate them using approved conduit repair kits and backfill with approved material and compact using the directed method as specified in 203.03.02.D. Install the Junction Box after approval by the RE. Ensure that the cut conduit ends are terminated at the entrance of the junction box wall using a manufacturer recommended kit depending upon the type of conduits. Ensure that the fiber optic cable is pulled back from the adjacent junction boxes in equal length to maintain the required slack for any immediate or future splicing.

6. Control Center System.

THE FOLLOWING IS ADDED:

Ensure the ITS System Network working drawing is submitted in a format acceptable to the Department. Sample Working Drawings are available at:

http://www.state.nj.us/transportation/eng/elec/ITS/pdf/sampledrawings.pdf

Ensure the working drawing contains the following information:

- 1 Affected network nodes are shown in nodal format with Latitude/Longitude
- 2. Each node shows equipment type and the proposed communication links between them.
- 3. Distances between Ethernet switches and calculated dB loss between them.
- 4. A Communication Network Assignment Table specifying Equipment Location (Node, Site ID, Lat/Long, Plan sheet reference, Route, Mile Post), Equipment Information (Item No., Description, Function, VLAN No., Subnet Mask, and IP Address)

Supply and install equipment, software, software revisions, firmware, miscellaneous wiring and cabling, at the specified Control Centers to ensure the remote operation and control of all ITS field devices from the Traffic Operation Centers. Comply with building installation requirements, restrictions, access, and security requirements in the performance of work. The material and work required for the integration of the various ITS installations into the various existing operating systems or subsystems used by the Department includes, but is not limited to, the following:

- 1. At least 6 days in advance of requiring access to the designated Control Center, submit a written notice to the RE requesting access.
- 2. Ensure complete functionality with field devices. Coordinate with the Department for access, rack space, and LAN connections to Client Workstations, respectively.
- Ensure CCTV encoders are compatible with approved camera system especially for PTZ and focus control and CCTV Controller Software.
- 4. Ensure CCTV Controller Software is updated by integrating new cameras installed and ensure video and control is available to all necessary Traffic Operations personnel.
- Ensure Transmit Devices are integrated and operational in accordance with Contract requirements.
 Develop the required travel time routes and the appropriate travel time sign messages as directed by the Department.
- 6. Ensure CTSS components are fully integrated and all the necessary functionality is demonstrated in the designated CTSS Controller Software.
- 7. Secure and provide all necessary Network configurations and assignments as directed by the Department.
- 8. Provide and install any other electronic equipment that may become necessary as a result of network protocol translation, electrical signal transmission degradation or communications media translation (fiber optic, coax, DSL interface, network interface, etc.)
- 9. Provide for software support to integrate new ITS devices into new and existing platforms for all workstations and servers utilized by DOT operators. This includes any required work from each of the software suppliers for workstations located remotely from the Traffic Operation Centers. The Department will provide information regarding the respective system, on particulars for authorized remote users.
- 10. Provide for the installation of network assignments for all field devices as well as enabling the network and device management protocols as directed by the Department.
- 11. Ensure that network support requests through the RE to the Department are made at least 60 days prior to the installation of any device to be included in the network.

THE FOLLOWING IS ADDED:

- 7. ITS Conduits. Install Flexible Nonmetallic Conduits as specified in 701.03.07 with the following exceptions:
 - a. Do not install mechanical joints on conduit runs between junction boxes.
 - b. Obtain RE approval for fusion joints that may be permitted under special circumstances on conduit runs between junction boxes.
 - c. Provide an as-built list indicating the location of all joints to the RE.
 - d. Install a continuous tracer wire without any splice in the conduits and from junction box to a termination point in the field cabinet.
 - e. Ensure that all conduits and ducts entering a junction box, foundation, cabinet, hub, or building are terminated based on manufacturer's recommendation and are rodent proofed and sealed around cables, or plugged if conduit is built for future use.
 - f. Ensure that the ITS Conduits facilitate the various means of cable and wire installations including but not limited to pulling, jetting, and blowing of Fiber optic cable and electrical wires.
 - g. When lateral ITS conduits are installed under a roadway, install a Schedule 80 rated protective sleeve around the group of conduits.
- 8. **Fiberoptic Cross-Connect Cabinet.** Submit working drawings for approval that include a block wiring diagram illustrating the interconnection of the system components within the cabinet. Identify each component by manufacturer, model, and CLEI number. Install a Fiberoptic Cross Connect Cabinet on Foundation ITS Type A with concrete pads on front and back of the cabinet. Ensure all fiber optic cables entering this cabinet are terminated into individual patch panels. Provide and install jumpers between multiple patch panels as required to complete the fiber network continuity.

C. Testing.

THE FIRST PARAGRAPH IS CHANGED TO:

Perform wiring and cable testing, as specified in 701.03.15.D, before performing any other testing. Complete the device and system testing as specified on the Department provided forms and instructions.

1. Device Testing.

b. Level B.

THE FIRST SENTENCE IS CHANGED TO:

Demonstrate that each device is fully operational from the designated control center to the work site with the original equipment manufacturer's software.

2. Project Testing.

THE FIRST SENTENCE OF THE SECOND PARAGRAPH IS CHANGED TO:

After the Contractor's verification test, the Department will conduct a 14-day observational and functional test period of all systems on the Project.

E. Final Documentation.

THE FOLLOWING IS ADDED AT THE END OF FIRST PARAGRAPH:

Place one set of all manuals of each device in the respective controller cabinet installed in the field, and provide a set to the RE. Also, send an electronic set to the RE. Provide all documentation listed under this section at or prior to Substantial Completion of the project.

THE FOLLOWING IS ADDED TO THE FOURTH PARAGRAPH:

10. Certification of successful deployment of ITS components from the respective equipment manufacturers with complete details of any repair work performed under warranty.

THE FOLLOWING IS ADDED:

G. Warranty. In addition to the provisions set forth in Section 108.21, document all repairs made by the manufacturer or its designated representative to the device under warranty during construction. Include an explanation of the exact repairs made and identification of parts replaced by part number and circuit number. Provide all necessary equipment for safe access to the installed device along with traffic control promptly upon request by the manufacturer to perform the repairs under warranty during this period. Provide the Department with a complete record of the repairs made to each device as part of the Final Documentation. Ensure that a minimum two year warranty certificate by the manufacturer is provided and transferred to the Department with documentation as set forth in Section 704.02.01 for any repairs to be performed by the manufacturer after substantial completion.

704.03.02 Camera Surveillance System (CSS)

B. Installation.

The Department will allow existing camera system shutdowns from _____. For each half hour the work extends beyond those time frames, the Department will assess liquidated damages of \$500 per half hour.

THE FOLLOWING IS ADDED AFTER THE FIRST PARAGRAPH:

If directed by the RE, provide a bucket truck with safety equipment that can reach the height of the camera. Operate the bucket truck for the Department to use to determine the camera's final location and orientation, and for testing.

1. Foundation CSS.

THE FOLLOWING IS ADDED:

Ensure that the anchor bolts are placed after verifying the orientation of the camera lowering system to minimize the obstruction of desired camera view by the Camera Standard.

2. Camera Standard.

THE FOLLOWING IS ADDED:

At least 30 days before beginning construction, submit working drawings for approval that include structural calculations meeting the specified criteria. Ensure the calculations are signed and sealed by a Professional Engineer.

3. Camera

THE FIRST PARAGRAPH IS CHANGED TO:

Mount the camera housing and camera according to the manufacturer's recommendation. Ensure that the camera's field of view is unobstructed. Perform tree trimming and site clearing to provide an unobstructed field of view as directed by the RE. Set up "On Screen Display" to indicate the quadrant views with directional titles (e.g. NB view, EB view, SB view, WB view) displayed in the bottom right corner of the screen for each camera. Leave the display blank for any quadrant not representing any highway view. For a camera with multiple highway views, include route and directional title (e.g. Rt 1 NB view). Also, establish a pan and tilt zones system and set up 4 presets for quick pan-tilt-zoom views prior to level B testing. At least 6 days prior to Level C testing, submit a request to the RE for the Department to integrate each camera into the designated control center CSS control software management system in use at the time of construction.

THE FOURTH PARAGRAPH IS CHANGE TO:

Provide a drill, a drill adaptor assembly and a manual crank assembly with handle for each impacted TOC when a CSS Type A or B standard is installed.

F. Equipment Training.

THE FOLLOWING IS ADDED:

G. Warranty. Perform repairs under warranty and provide documentation as specified in 704.03.01.G.

704.03.03 Fiber Optic Cable

B. Installation.

Coordinate with the Department for exact timeframes of existing system shutdowns on the fiber network. For each half hour the work extends beyond those time frames, the Department will assess liquidated damages of \$500 per half hour.

THE FOLLOWING IS ADDED TO THE SIXTH PARAGRAPH:

When installing fiber optic cable in existing conduits, install a tracer wire as specified in 701.03.15.A. Perform testing of existing tracer wires for continuity and perform splicing required to ensure access to the tracer wire from cabinet to cabinet.

THE FIRST SENTENCE OF THE LAST PARAGRAPH IS REVISED TO:

Splice a manufacturer recommended fiber optic breakout kit with connectors to each end of the strands for a cable that terminates at a device cabinet.

C. Testing

THE LAST PARAGRAPH IS CHANGED TO:

After completion of Level 1 and 2 tests, perform network communication system testing and demonstrate that the communication system is fully operational to meet the material specifications and project requirements. Complete the testing as specified on the Department provided forms and instructions.

F. Equipment Training.

704.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEMS ARE ADDED:

Item	Pay Unit
ITS CONDUITS, TYPE	LINEAR FOOT
METER CABINET ITS	UNIT
FOUNDATION CSS	UNIT
COMMUNICATION HUB MODIFICATIONS	UNIT
FIBER OPTIC SPLICE	UNIT
ITS MODIFICATION TO TOC	LUMP SUM
E FOLLOWING ITEMS ARE DELETED:	

THE

<i>Item</i>	Pay Unit
DMS STANDARD TYPE	UNIT
FOUNDATION CSS TYPE	UNIT
FOUNDATION DMS TYPE	UNIT

THE FOLLOWING IS ADDED AFTER THE FIRST PARAGRAPH:

The Department will consider ITS CONDUITS, TYPE ____ as a single conduit comprised of multiple individual conduits as shown in details and will make payment as one unit.

The Department will accept either drilled shaft foundation method or alternate spread footing method for the installation of ground mounted DMS sign structures and will make payment under FOUNDATION DMS GROUND MOUNTED.

THE TABLE UNDER SECOND PARAGRAPH IS REVISED TO:

Work Completed	Payment
Installing the Item	60% of Total Contract Price
Successful completion of Level A testing	10% of Total Contract Price
Successful completion of Level B testing	10% of Total Contract Price
Successful completion of Level C testing	10% of Total Contract Price
Successful completion of Project testing	10% of Total Contract Price

DIVISION 800 – LANDSCAPING

SECTION 807 – TOPSOIL STABILIZATION

807.01 DESCRIPTION

THE FOLLOWING IS ADDED TO THIS SECTION:

This Section also describes the requirements for constructing washed riverjack stone surface.

This Section also describes the requirements for furnishing and installing a landscape weed barrier in mulch bed areas.

807.02 MATERIALS

THE FOLLOWING IS ADDED TO THIS SECTION:

Ensure washed river jack stone surface is composed of washed river type rounded stones conforming to Subsection 901.03.02 and graded to produce stones in the following ranges:

Washed gravel 3/8-inch to 1/2-inch range

River jacks: 2-inches to 4-inches size range.

Ensure the color of the stones occurs as a blend of whites, grays, tans, reds, and light browns. Ensure all of the material originates from the same source and is processed as part of continual operation.

Provide a landscape weed barrier that is 100% polypropylene woven fabric, black in color, and a minimum weight of 2.5 ounces per square yard. Provide 12 inch staples of No. 25 plain iron wire for anchoring the landscape weed barrier.

807.03 CONSTRUCTION

THE FOLLOWING IS ADDED TO THIS SECTION:

807.03.02 Washed Riverjack Stone with Weed Barrier

Submit a sample of the material to the RE for approval.

Excavate as specified in 202.03.03. Shape and compact the underlying material to produce a firm even surface.

Place the landscape weed barrier followed by a uniform 1-inch layer of washed gravel. On this layer, place a layer of the larger river jacks followed by another layer of washed gravel of sufficient thickness to leave exposed approximately one quarter to one half of the visibly exposed layer of the river jacks. Ensure the washed gravel river jack surface is compacted lightly with a vibratory plate compactor in order to "key" the stones together to form a uniform surface.

807.03.03 Landscape Weed Barrier

Install all plant material prior to the installation of the landscape weed barrier in accordance with Section 811. Smooth soil so that it is free of depressions, clods, mounds, large stones or other debris. Apply pre-emergent herbicide to the area prior to the installation of the landscape weed barrier. Install the landscape weed barrier according to the Manufacturer's recommendations. Bury the landscape weed barrier 6 inches deep in a vertical position with the uphill strip overlapping for a distance of 6 inches to form a smooth, shingle-like effect where the landscape weed barrier is installed end to end.

Overlap the landscape weed barrier 6 inches when laid parallel. Neatly trim the landscape weed barrier to conform to the edge of the planting area. If the landscape weed barrier becomes dislodged and exposed at any time during the plant establishment or replacement period, reinstall the landscape weed barrier at no cost to the Department.

807.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEMS ARE ADDED:

Pay ItemPay UnitWASHED RIVERJACK STONE WITH WEED BARRIERSQUARE YARDLANDSCAPE WEED BARRIERSQUARE YARD

SECTION 809 – MULCHING

809.03 CONSTRUCTION

809.03.03 Mulching Plants

THE FOLLOWING IS ADDED:

Do not mulch areas designated as Narcissus in Turf.

SECTION 811 – PLANTING

811.01 DESCRIPTION

THE FOLLOWING IS ADDED TO THIS SECTION:

This Section also describes the requirements for performing the recommended tree maintenance of the existing street trees in the median that are to remain. Tree maintenance includes the placement of tree protection, root pruning of any damaged roots, tree trimming, the furnishing and placing of fertilizer, and the general treatment for any disease or insect infestation.

This Section also describes the requirements for constructing a landscape accent wall.

811.02 MATERIALS

THE FOLLOWING IS ADDED TO THIS SECTION:

Subsurface Drainage Geotextile	919.01
Coarse Aggregate (No. 57)	901.03
I-9 Soil Aggregate	901.11
Corrugated Steel Underdrain Pipe	909.02.06

Modular units for the landscape accent wall shall be high-strength, low-absorption solid concrete segmental blocks, with straight geometry and tumbled edges. Each unit shall be 6 inches high x 12 inches deep x 16 inches wide (front face) and 14 inches wide (rear face). The weight shall be 82 pounds. All units shall be sound and free of chips, cracks or other defects that would interfere with the placement of the unit. Units which are chipped or cracked, will not be accepted. The color shall match the color of the retaining walls described in Section 613.02 of these Special Provisions. The modular units shall conform to ASTM C1372-01– Standard Specifications for Segmental Retaining Wall Units. The units shall be capable of attaining both convex and concave curves for outside and inside corners. The structural and geometric requirements of the modular units shall conform to the following:

Compressive strength: 3000 psi minimum in accordance with ASTM C 90 and C 140. Moisture absorption rate of 8% maximum, by weight Dimensional tolerances equal +/- 1/8 inch from nominal unit dimensions, except height, which shall be +/- 1/16 inch.

Geosynthetic reinforcement shall be by use of geogrids or geotextiles manufactured as a soil reinforcement element.

Provide 10-6-4 (NPK) fertilizer. Provide a delivery slip for each shipment showing the weight and a certified chemical analysis of the fertilizer composition.

Provide pesticides, fungicides, and/or herbicides for the treatment of the specific infestation found.

811.03 CONSTRUCTION

811.03.01 Planting

D. Planting Beds.

ADD THE FOLLOWING TO THE THIRD PARAGRAPH:

Plant bulbs in established turf or in bed areas where designated as Narcissus in Turf at the required depth prior to Fertilizing and Seeding operations at the direction of the RE. Maintain the desired grade; do not use heavy equipment on these areas once the bulbs have been set.

E. Excavation for Plant Pits and Beds.

THE LAST SENTENCE OF THE SECOND PARAGRAPH IS CHANGED TO:

Obtain RE approval before reusing topsoil from the excavated pits.

I. Watering.

THE FIRST PARAGRAPH IS CHANGED TO:

Water plants with sufficient frequency and quantity to ensure that the soil surrounding the root system remains moist but not saturated.

811.03.02 Plant Establishment Period

THE THIRD AND FOURTH PARAGRAPHS ARE CHANGED TO:

The Department will reinspect the plants annually for three (3) years, beginning approximately 1 year after the start of the plant establishment period. If the Department determines that plants need to be replaced after each inspection, replant plants as specified in 811.03.01 within 3 weeks of notification. If replacing outside of the optimal planting season as specified in Table 811.03.01-1, only use containerized or balled and burlapped plants that are certified as being dug dormant.

2. Maintenance Bond.

Provide a bond to the Department in the amount of \$75,000.00.

THE FOLLOWING IS ADDED TO THIS SECTION:

811.03.03 Tree Maintenance

Complete all tree maintenance by or under the direction of a tree expert certified in the State of New Jersey with a minimum of five years experience. Evaluate construction related damaged and perform tree maintenance as necessary. Notify the RE if other tree maintenance, not listed in this specification, is required.

Provide tree protection before construction activity begins; identify the root system of the tree by delineating silt fence around the drip line of the tree canopy to prevent compaction. In the areas where tree protection is coincidental with areas of grading, do not dig in the area of the root systems unless a certified tree expert is present during the time of the digging. Perform root pruning as directed by the certified tree expert.

Trim trees in accordance with Section 802.

Follow manufacturer's recommendations when applying fertilizer, pesticides, fungicides, and/or herbicides. A certified pesticide applicator is required for applying pesticide, fungicides, and/or herbicides.

811.03.04 Landscape Accent Wall

Submit working drawings for landscape accent wall in accordance with Section 105.

Provide a representative sample of 5 blocks to the RE for inspection of size, texture and color for approval by the Department.

Excavate to required subgrade elevation, construct a leveling base, lay the base course and consecutive courses of modular units, backfill behind the units, secure the units together with the appropriate connection, place underdrain pipe, drainage aggregate, and geotextile behind wall and construct soil backfill with a geosynthetic soil reinforcement in accordance with the manufacturer's recommendation.

No sawcuts shall be exposed to view. All exposed faces shall have split edges. All corners shall connect and overlap. No mitered corners shall be accepted. The wall shall be finished with cap units placed along the top course according to the manufacturer's recommendations. There shall be no gaps greater than 1/8 inch on the cap units. All cap units and corner units shall be secured using an exterior concrete adhesive as recommended by the manufacturer.

811.04 MEASUREMENT AND PAYMENT

THE FOLLOWING ITEMS ARE ADDED TO THIS SECTION:

Item
TREE MAINTENANCE
LANDSCAPE ACCENT WALL

Pay Unit LUMP SUM SQUARE YARD

Tree protection is paid for under the item Silt Fence.

DIVISION 900 – MATERIALS

SECTION 901 – AGGREGATES

901.11 SOIL AGGREGATE

1. Composition of Soil Aggregate.

THE FOLLOWING IS ADDED TO THE LAST PARAGRAPH:

For Designation I-14, the Contractor may use up to 30 percent steel slag by weight of the coarse aggregate portion of the soil aggregate. Obtain steel slag from a source listed on the QPL as specified in 901.01. Use steel slag that was produced as a co-product of the steel making process. Ensure that the steel slag consists of tough, durable pieces that are uniform in density and quality. Stockpile steel slag as specified in 901.02. Ensure steel slag for blending with I-14 Soil Aggregate does not exceed 0.50 percent expansion from hydration when tested according to ASTM D 4792.

SECTION 902 - ASPHALT

902.02.02 Composition of Mixtures

TABLE 902.02.02-2 IS CHANGED TO:

Table 902.02.02-2 Additional Fine Aggregate Requirements for HMA		
Tests	Test Method	Minimum Percent
Uncompacted Void Content of Fine Aggregate	AASHTO T 304, Method A	45
Sand Equivalent	AASHTO T 176	45

902.03.02 Mix Design

THE FOURTH PARAGRAGH IS CHANGED TO:

The ME will test 2 specimens to verify that the final JMF produces a mixture that has a minimum void content as specified in Table 902.03.03-1. The ME will determine percent air voids according to AASHTO T 209, and either NJDOT B-6 or AASHTO T 331.

902.03.03 Sampling and Testing

THE FOLLOWING IS ADDED TO THE FIRST PARAGRAPH:

Ensure that the mix meets the requirements as specified in 902.02.04.A, otherwise the RE or ME will reject the material.

THE FOURTH PARAGRAPH IS CHANGED TO:

The ME will perform sampling according to NJDOT B-2 or ASTM D 3665, and will perform testing for composition according to AASHTO T 308 or NJDOT B-5. Perform testing for air voids according to AASHTO T 209 and either NJDOT B-6 or AASHTO T 331. Perform testing for draindown according to NJDOT B-7 or NJDOT B-8.

902.04.03 Sampling and Testing

THE FIRST PARAGRAPH IS CHANGED TO:

Ensure that the mix meets the requirements as specified in 902.02.04.A, otherwise the RE or ME will reject the material. Maintain the temperature of the mix between 300 °F and 330 °F. Perform and meet requirements for quality control testing as specified in 902.02.04.C.

902.05.01 Composition of Mixture

THE FIFTH PARAGRAPH IS CHANGED TO:

For fine aggregate, use stone sand conforming to 901.05.02. Ensure that the combined fine aggregate in the mixture conforms to the requirements in Table 902.02.02-2.

902.05.02 Mix Design

THE FIRST PARAGRAPH IS CHANGED TO:

Design the SMA to meet the requirements in Table 902.05.02-1 and Table 902.05.02-2. Prepare the JMF according to AASHTO R 46. Determine the JMF at 4 percent air voids and 75 gyrations of the Superpave gyratory compactor.

TABLE 902.05.02-2 IS CHANGED TO:

Table 902.05.02-2 SMA Mixtures Volumetrics For Design and Plant Production				
Property	Production Control Tolerances	Requirement		
Air Voids	±1%	4.0%		
Voids in Mineral Aggregate (VMA)	_	17.0% minimum		
VCA_{mix}	_	Less than VCA _{dry}		
Draindown @ production temperature	_	0.30% maximum		
Asphalt Binder Content (NJDOT B-5)	±0.15%	6% minimum		
Asphalt Binder Content (AASHTO T 308)	±0.40%	6% minimum		
Tensile Strength Ratio (AASHTO T 283)	_	80% minimum		

902.05.03 Sampling and Testing

THE FOLLOWING IS ADDED TO THE FIRST PARAGRAPH:

Ensure that the mix meets the requirements as specified in 902.02.04.A, otherwise the RE or ME will reject the material.

THE SECOND PARAGRAPH IS CHANGED TO:

During production at the plant, the ME will take a sample from each 700 tons of production to verify composition and air voids. Conduct draindown, VCAmix, VCAdry, and VMA testing as directed by the ME. Perform tests according to AASHTO R 46.

THE FOURTH PARAGRAPH IS CHANGED TO:

The ME will perform sampling according to NJDOT B-2 or ASTM D 3665, and will perform testing for composition according to AASHTO T 308, or NJDOT B-5. The ME will determine bulk specific gravity of the compacted sample according to AASHTO T 166 or AASHTO T 331. The ME will use the most current QC maximum specific gravity test result, obtained according to AASHTO T 209, in calculating the volumetric properties of the SMA. Perform testing for draindown according to AASHTO T 305.

902.06.03 Sampling and Testing

THE FOLLOWING IS ADDED TO THE FIRST PARAGRAPH:

Ensure that the mix meets the requirements as specified in 902.02.04.A, except that the temperature of the mix at discharge is required to be between 230 °F and 275 °F, otherwise the RE or ME will reject the material.

THE FOLLOWING SUBSECTIONS ARE ADDED

902.07 ASPHALT-RUBBER OPEN-GRADED FRICTION COURSE (AR-OGFC)

902.07.01 Composition of Mixture

Mix AR-OGFC in a plant listed on the QPL and conforming to the requirements for HMA plants specified in 1009.01. Ensure the HMA plant is equipped with asphalt-rubber binder blending equipment as specified in 1009.03.

Composition of mixture for AR-OGFC is coarse aggregate, fine aggregate and asphalt-rubber binder. Ensure that the mixture conforms to the following requirements:

- 1. Use aggregates that conform to 901.05. Use fine aggregate that is manufactured stone sand and conforms to Table 902.02.02-2.
- 2. Do not use RAP, CRCG, GBSM, or RPCSA.
- 3. Use asphalt-rubber binder that conforms to 902.07.02.

902.07.02 Asphalt-Rubber Binder

- **A. Materials.** Use the following materials:
 - 1. **Ground Crumb Rubber.** Ensure that the ground crumb rubber has a specific gravity of 1.15 ± 0.05, is free of wire or other contaminating materials, and contains not more than 0.5 percent fabric. Use crumb rubber that is ambient ground and conforms to the gradation requirements specified in Table 902.07.02-1. Ensure that the moisture content is less than 0.75 percent. The Contractor may add up to four percent calcium carbonate by weight of the granulated rubber, to prevent the particles from sticking together.

Table 902.07.02-1 Ground Crumb Rubber Gradation		
Sieve Size	Percent Passing ^{1, 2}	
No. 8	100	
No. 16	65 – 100	
No. 30	20 - 100	
No. 50	0 - 45	
No. 200	0 – 5	

- 1. Perform gradation according to AASHTO T 27 using a minimum 50 gram sample.
- 2. Ensure that the gradation is performed as specified in NJDOT B-11.

Submit to the ME a certification of compliance, as specified in 106.07, for the ground crumb rubber. In addition, ensure that the certificates confirm that the rubber is a crumb rubber, derived from processing whole scrap tires or shredded tire materials; and the tires from which the crumb rubber is produced are taken from automobiles, trucks, or other equipment owned and operated in the United States. Include with the certifications verifications that the processing did not produce, as a waste product, casings, or other round tire material that can hold water when stored or disposed of above ground.

2. Asphalt Binder. Use asphalt binder that conforms to AASHTO M 320, Table 1; PG 64-22, PG 58-28 or an approved blend of both grades.

The asphalt binder producer is required to provide the asphalt binder quality control plan annually to the ME for approval. Ensure that the quality control plan conforms to AASHTO R 26.

Submit to the ME a certification of compliance, as specified in 106.07, for the asphalt binder. The ME will perform quality assurance sampling and testing of each asphalt binder lot as defined in the approved quality control plan.

B. Mixing. Using the asphalt-rubber binder blending equipment in 1009.03, produce the asphalt-rubber binder to contain at least 17 percent ground rubber by the weight of total asphalt binder (asphalt + crumb rubber). Ensure that the temperature of the asphalt cement is between 350 and 400 °F at the time of addition of the ground rubber.

Ensure that there are no agglomerations of rubber particles in excess of two inches in the least dimension in the mixing chamber.

Document that the proportions are accurate and that the rubber has been uniformly incorporated into the mixture. Report as directed by the ME. Ensure that the crumb rubber and asphalt-cement are thoroughly mixed before beginning the one-hour reaction period. Rubber floating on the surface or agglomerations of rubber particles is evidence of insufficient mixing. Maintain the temperature of the asphalt-rubber binder immediately after mixing between 325 and 375 °F. Maintain the temperature of the asphalt-rubber binder for at least one hour before using.

C. **Properties.** Prepare asphalt-rubber binder using the "wet process." Physical properties are required to comply with the requirements of ASTM D 6114, Type II, except for the properties specified in Table 902.07.02-2.

Table 902.07.02-2 Asphalt-Rubber Binder Properties			
Property	Test Procedure	Requirement	
Resilience: 77 °F; %, minimum Rotational Viscosity ¹ 350 °F; cP	ASTM D 5329 NJDOT B-12	25 2000 – 4000	

- 1. The viscotester used must be correlated to a Rion (formerly Haake) Model VT-04 viscotester using the No. 1 Rotor. The Rion viscotester rotor, while in the off position, is required to be completely immersed in the binder at a temperature from 350 ± 3 °F for a minimum heat equilibrium period of 60 seconds, and the average viscosity determined from three separate constant readings (± 500 cP) taken within a 30 second time frame with the viscotester level during testing and turned off between readings. Continuous rotation of the rotor may cause thinning of the material immediately in contact with the rotor, resulting in erroneous results.
- **D. Handling and Testing.** Once the asphalt-rubber binder has been mixed, thoroughly agitate during periods of use to prevent settling of the rubber particles. During production, maintain asphalt-rubber binder between 325 and 375 °F. Ensure that asphalt-rubber binder is not held at 325 °F or higher for more than 16 hours. Allow asphalt-rubber binder held for more than 16 hours to cool. To reuse, gradually reheat to between 325 and 375 °F. Do not cool and reheat more than one time. Do not store asphalt-rubber binder above 250 °F for more than four days.

For each load or batch of asphalt-rubber binder, provide the RE with the following:

- 1. The source, grade, amount, and temperature of the asphalt cement before the addition of rubber.
- 2. The source and amount of rubber and the rubber content expressed as percent by the weight of the asphalt cement.
- 3. Times and dates of the rubber additions and resultant viscosity test.
- 4. A record of the temperature, with time and date reference for each load or batch. The record begins at the time of the addition of rubber and continue until the load or batch is completely used. Take readings and record every temperature change in excess of 20 °F, and as needed to document other events that are significant to batch use and quality.

902.07.03 Mix Design

Submit binder and mix designs including JMF for each mixture performed by an AASHTO accredited lab with at least five successfully completed asphalt-rubber open-graded friction course projects greater than 5,000 tons each. Include a statement naming the source of each component and a report with the results for the criteria specified in Table 902.07.03-1. Include a report detailing the rotational viscosity of the asphalt-rubber binder at 60, 90, 135, 240, and 1440 minutes. Submit lab qualifications and references to the ME for approval prior to beginning work.

Design the mix to meet the criteria in Table 902.07.03-1.

Table 902.07.03-1 JMF Master Ranges and Mixture Requirements AR-OGFC			
Mixture Designations (% Passing ¹)			
Sieve Sizes	AR-OGFC		
1/2"	100		
3/8"	90 - 100		

No. 4	20 – 40
No. 8	5 – 10
No. 200	0 - 3.0
Minimum asphalt-rubber binder, % ²	8.4
Minimum % Air Voids, design	15

- 1. Aggregate percent passing to be determined based on dry aggregate weight.
- 2. Asphalt-rubber binder content to be determined based on total weight of mix.

Determine and verify the JMF according to NJDOT B-8. Ensure that the JMF is within the master range specified in Table 902.07.03-1.

Prepare compacted test specimens for submittal to the ME at least 30 days before the initial production date. Prepare these specimens from material mixed according to the final JMF, using 50 gyrations of the Superpave gyratory compactor according to AASHTO T 312.

The ME will test 2 specimens to verify stone-on-stone contact according to NJDOT B-8 and that the final JMF produces a mixture that has a minimum void content as specified in Table 902.07.03-1. The ME will determine percent air voids according to AASHTO T 209 and AASHTO T 331.

The ME will test 2 test specimens for abrasion and impact resistance using a modified L.A. Abrasion Test according to NJDOT B-8. The maximum allowable loss as calculated by this method is 30 percent.

Do not modify, which includes changing the asphalt cement supplier, the JMF unless the ME approves the modification.

902.07.04 Sampling and Testing

A. General Acceptance Requirements. The RE or ME may reject and require disposal of any batch or shipment that is rendered unfit for its intended use due to contamination, segregation, improper temperature, lumps of cold material, or incomplete coating of the aggregate. For other than improper temperature, visual inspection of the material by the RE or ME is considered sufficient grounds for such rejection.

For asphalt-rubber binder, ensure that the temperature of the mixture at discharge from the plant or surge and storage bins is at least 290 °F but not greater than 330 °F.

Combine and mix the aggregates and asphalt-rubber binder to ensure that at least 95 percent of the coarse aggregate particles are entirely coated with asphalt-rubber binder as determined according to AASHTO T 195. If the ME determines that there is an on-going problem with coating, the ME may obtain random samples from 5 trucks and will determine the adequacy of the mixing on the average of particle counts made on these 5 test portions. If the requirement for 95 percent coating is not met on each sample, modify plant operations, as necessary, to obtain the required degree of coating.

B. Quality Control Testing. The HMA producer is required to provide a quality control (QC) technician who is certified by the Society of Asphalt Technologists of New Jersey as an Asphalt Technologist, Level 2. The QC technician may substitute equivalent technician certification by the Mid-Atlantic Region Technician Certification Program (MARTCP). Ensure that the QC technician is present during periods of mix production for the sole purpose of quality control testing and to assist the ME. The ME will not perform the quality control testing or other routine test functions in the absence of, or instead of, the QC technician.

The QC technician is required to perform sampling and testing according to the approved quality control plan, to keep the mix within the limits specified for the mix being produced. The QC technician may use acceptance test results or perform additional testing as necessary to control the mix.

For each acceptance test, perform maximum specific gravity testing according to AASHTO T 209 on a test portion of the sample taken by the ME. Sample and test coarse aggregate, fine aggregate and mineral filler according to the approved quality control plan for the plant.

C. Acceptance Testing. During production, the ME will take one random acceptance sample from each 700 tons of production to verify composition. The ME will perform sampling according to NJDOT B-2 or ASTM D 3665, and

will perform testing for composition according to AASHTO T 308 or NJDOT B-5. Perform testing for air voids according to T 209 and either B-6 or T 331. Perform testing for draindown according to NJDOT B-8.

Conduct air voids and draindown tests as directed by the ME.

If the composition testing results are outside of the production control tolerances specified in Table 902.07.04-1 for an acceptance sample, determine if a plant adjustment is needed and immediately run a quality control sample. If the quality control sample is also outside of the control tolerances in Table 902.07.04-1, immediately take corrective action to bring the mix into compliance. Take additional quality control samples after the corrective action to ensure that the mix is within the production control tolerances. If two consecutive acceptance samples are outside the tolerances specified in Table 902.07.04-1, immediately stop production. Obtain ME approval of a plant correction plan before resuming production. Upon restarting production, do not transport mixture to the Project Limits before the results of a QC sample from the mixture indicate that the mixture meets JMF tolerances. The ME will reject mixture produced at initial restarting that does not meet tolerances.

Sieve Sizes	Production Control Tolerances from JMF ¹
1/2"	±6.0
3/8"	±5.5
No. 4	±5.5
No. 8	±4.5
No. 200	±2.0
Asphalt-rubber binder, % (AASHTO T 308)	±0.40
Asphalt-rubber binder, % (NJDOT B-5)	±0.15
Minimum % Air Voids	1.0% less than design requirement

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902.08 HIGH PERFORMANCE THIN OVERLAY (HPTO)

902.08.01 Composition of Mixture

Mix HPTO in a plant that is listed on the QPL and conforms to the requirements for HMA Plants as specified in 1009.01. The composition of the mixture for HPTO is coarse aggregate, fine aggregate, and asphalt binder, and may also include mineral filler. Do not use Reclaimed Asphalt Pavement (RAP), Ground Bituminous Shingle Material, Remediated Petroleum Contaminated Soil Aggregate, or Crushed Recycled Container Glass (CRCG). Use asphalt binder and aggregates that meet the following requirements:

- 1. For the asphalt binder, use PG 76-22 as specified in 902.01.01.
- 2. Use coarse aggregate that is argillite, gneiss, granite, quartzite, or trap rock and conforms to 901.05.01.
- 3. For fine aggregate, use stone sand conforming to 901.05.02 and has an uncompacted void content of at least 45 percent when tested according to AASHTO T 304, Method A. In addition, the minimum sand equivalent is 45 percent when tested according to AASHTO T 176.
- 4. If necessary, use mineral filler as specified in 901.05.03.

902.08.02 Mix Design

At least 45 days before initial production, submit a job mix formula for the HPTO on forms supplied by the Department. Include a statement naming the source of each component and a report showing the results meet the criteria specified in Tables 902.08.03-1 and 902.08.03-2.

For the job mix formula for the HPTO mixture, establish the percentage of dry weight of aggregate passing each required sieve size and an optimum percentage of asphalt binder based upon the weight of the total mix. Determine the optimum percentage of asphalt binder according to AASHTO R 35 and M 323 with an Ndes of 50 gyrations. Before maximum

specific gravity testing or compaction of specimens, condition the mix for 2 hours according to the requirements for conditioning for volumetric mix design in AASHTO R 30, Section 7.1. If the absorption of the combined aggregate is more than 1.5 percent according to AASHTO T 84 and T 85, condition the mix for 4 hours according to AASHTO R 30, Section 7.2 prior to compaction of specimens (AASHTO T 312) and determination of maximum specific gravity (AASHTO T 209). Ensure that the job mix formula is within the master range specified in, Table 902.08.03-1.

Ensure that the job mix formula provides a mixture that meets a minimum tensile strength ratio (TSR) of 85 percent when prepared according to AASTHO T 312 and tested according to AASHTO T 283 with the following exceptions:

- 1. Before compaction, condition the mixture for 2 hours according to AASHTO R 30 Section 7.1.
- 2. Compact specimens with 40 gyrations.
- 3. Extrude specimens as soon as possible without damaging.
- 4. Use AASHTO T 269 to determine void content.
- 5. Record the void content of the specimens.
- 6. If less than 55 percent saturation is achieved, the procedure does not need to be repeated, unless the difference in tensile strength between duplicate specimens is greater than 25 pounds per square inch.
- 7. If visual stripping is detected, modify or readjust the mix.

For each mix design, submit three gyratory specimens and one loose sample corresponding to the composition of the job mix formula, including the design asphalt content. The ME will use these samples for verification of the properties of the job mix formula. Compact the specimens to the design number of gyrations (Ndes). To be acceptable all three gyratory specimens must comply with the gradation and asphalt content requirements in Table 902.08.03-1 and with the control requirements in Table 902.08.03-2. The ME reserves the right to be present at the time of molding the gyratory specimens.

In addition, submit 6 gyratory specimens and a 5 gallon bucket of loose mix to the ME. Compact the additional gyratory specimens according to AASHTO T 312. Ensure that the 6 gyratory specimens are 77 millimeters high and have an air void content of 5.0 ± 0.5 percent. The ME will use the additional samples for performance testing of the HPTO mix. The ME will test the specimens using an Asphalt Pavement Analyzer according to AASHTO TP 63 at 64 °C, 100 pounds per square inch hose pressure, and 100 pound wheel load. The ME will approve the job mix formula if the average rut depth for the 6 specimens in the asphalt pavement analyzer testing is not more than 4 millimeters in 8,000 loading cycles. If the job mix formula does not meet the APA criteria, redesign the HPTO mix.

If unsatisfactory results for any specified characteristic of the work make it necessary, establish a new job mix formula for approval. In such instances, if corrective action is not taken, the ME may require an appropriate adjustment.

If a change in sources is made or a change in the properties of materials occurs, the ME will require that a new job mix formula be established and approved before production can continue.

902.08.03 Sampling and Testing

A. General Acceptance Requirements. The RE or ME may reject and require disposal of any batch or shipment that is rendered unfit for its intended use due to contamination, segregation, improper temperature, lumps of cold material, or incomplete coating of the aggregate. For other than improper temperature, visual inspection of the material by the RE or ME is considered sufficient grounds for such rejection.

Ensure that the temperature of the HPTO at discharge from the plant or surge and storage bins is maintained between 300 and 330 °F.

Combine and mix the aggregates and asphalt binder to ensure that at least 95 percent of the coarse aggregate particles are entirely coated with asphalt binder as determined according to AASHTO T 195. If the ME determines that there is an on-going problem with coating, the ME may obtain random samples from 5 trucks and will determine the adequacy of the mixing on the average of particle counts made on these 5 test portions. If the requirement for 95 percent coating is not met on each sample, modify plant operations, as necessary, to obtain the required degree of coating.

B. Sampling. The ME will take 5 stratified random samples of HPTO for volumetric acceptance testing from each lot of approximately 3500 tons of a mix. When a lot of HPTO is less than 3500 tons, the ME will take samples at

random for each mix at the rate of one sample for each 700 tons. The ME will perform sampling according to AASHTO T 168, NJDOT B-2, or ASTM D 3665.

Use a portion of the samples taken for composition testing, unless composition is determined by hot bin analysis. If using hot bin analysis at a fully automated batch plant, take 5 samples from each lot corresponding to the volumetric acceptance samples, under the supervision of the ME.

C. Quality Control Testing. The HMA producer is required to provide a quality control (QC) technician who is certified by the Society of Asphalt Technologists of New Jersey as an Asphalt Technologist, Level 2. The QC technician may substitute equivalent technician certification by the Mid-Atlantic Region Technician Certification Program (MARTCP). Ensure that the QC technician is present during periods of mix production for the sole purpose of quality control testing and to assist the ME. The ME will not perform the quality control testing or other routine test functions in the absence of, or instead of, the QC technician.

The QC technician is required to perform sampling and testing according to the approved quality control plan, to keep the mix within the limits specified for the HPTO mix being produced. The QC technician may use acceptance test results or perform additional testing as necessary to control the mix.

To determine the composition, perform ignition oven testing according to AASHTO T 308. For fully automated plants, the QC technician may determine composition using hot bin analysis according to NJDOT B-5. Use only one method for determining composition within a lot.

For each acceptance test, perform maximum specific gravity testing according to AASHTO T 209 on a test portion of the sample taken by the ME. Sample and test coarse aggregate, fine aggregate, mineral filler, and RAP according to the approved quality control plan for the plant.

D. Acceptance Testing and Requirements. The ME will determine volumetric properties at Ndes for acceptance from samples taken, compacted, and tested at the HMA plant. The ME will compact HPTO to 50 gyrations, using equipment according to AASHTO T 312. The ME will determine bulk specific gravity of the compacted sample according to AASHTO T 166. The ME will use the most current QC maximum specific gravity test result in calculating the volumetric properties of the HPTO.

The ME will determine the dust-to-binder ratio from the composition results as tested by the QC technician.

Ensure that the HMA mixture conforms to the requirements specified in Table 902.08.03-2, and to the gradation requirements in Table 902.08.03-1. If 2 samples in a lot fail to conform to the gradation or volumetric requirements, immediately initiate corrective action.

The ME will test a minimum of 1 sample per lot for moisture, basing moisture determinations on the weight loss of an approximately 1600-gram sample of mixture heated for 1 hour in an oven at 280 ± 5 °F. Ensure that the moisture content of the mixture at discharge from the plant does not exceed 1.0 percent.

E. Performance Testing. Provide 6 gyratory specimens and a 5 gallon bucket of loose mix to the ME. Compact the additional gyratory specimens according to AASHTO T 312. Ensure that the 6 gyratory specimens are 77 millimeters high and have an air void content of 5.0 ± 0.5 percent. The first sample is required to be taken in the first lot of production. Thereafter, every third lot is required to be sampled. The ME will use the samples for performance testing of the HPTO mix. The ME will test the specimens using an Asphalt Pavement Analyzer according to AASHTO TP 63 at 64 °C, 100 pounds per square inch hose pressure, and 100 pounds wheel load. If the HPTO mix exceeds the APA criteria of 4 mm in 8000 loading cycles, the ME may stop production until corrective action is taken. If the HPTO mix exceeds the APA criteria of 12 mm in 8000 loading cycles, the RE may require removal and replacement of the lot of HPTO.

Table 902.08.03-1 HPTO Grading of Total Aggregate				
Sieve Size	Percent Passing by Mass			
3/8"	100			
#4	65-85			
#8	33-55			
#16	20-35			
#30	15-30			

#50	10-20
#100	5-15
#200	5.0-8.0
Minimum Percent Asphalt by Mass of Total Mix	7

Table 902.08.03-2	Volumetric Rec	nuirements for	Design and	Control of HPTO

	Required Density (% of Max. Sp. Gr.)		Voids in Mineral Aggregate	Dust to Binder Ratio	Draindown AASHTO T 305
	N _{des} (50 gyrations)	N _{max} (100 gyrations)	(VMA)		
Design Requirements	96.5	≤99.0	≥ 18.0 %	0.6 - 1.2	≤ 0.1 %
Control Requirements	95.5 - 97.5	≤99.0	≥ 18.0 %	0.6 – 1.3	≤ 0.1 %

SECTION 903 - CONCRETE

903.03.05 Control and Acceptance Testing Requirements

E. Acceptance Testing for Strength for Pay-Adjustment Items.

Concrete Items which are subject to pay adjustment and the base prices are as follows:

ITEMS	DESCRIPTION	UNIT	BASE PRICE
505027P	PRESTRESSED CONCRETE BOX BEAM, (TYPE BI-48), 48" X 27"	LF	\$215.00

903.03.06 Tables

Table 903.03.06-2 Requirements for Structural Concrete Items

THE SEVENTH LINE UNDER CAST-IN-PLACE ITEMS IS CHANGED TO:

Table 903.03.06-2 Requirements for Structural Concrete Items					
	Concrete	Slump ¹		ntrainment for .ggregate ¹	
	Class	Class (inches)	No. 57 & No. 67	No. 8	
Decks, Sidewalks, Curbs, Parapets, Concrete Patch	A	3 ± 1	6.0 ± 1.5	7.0 ± 1.5	

903.05 HIGH PERFORMANCE CONCRETE (HPC)

903.05.02 Mix Design and Verification

THE FOLLOWING IS ADDED AT THE END OF THE FIRST PARRAGRAPH:

Design mixes according to the HPC-3 criteria for use in prestressed concrete deck panels.

Table 903.05.02-1 Design and Verification Requirements for HPC				
	Requirements			
Performance Characteristic	Test Method	HPC-1	HPC-2	HPC-3
Scaling Resistance ¹ @ 50 cycles (visual rating of the surface, maximum)	ASTM C 672	3	-	-
Abrasion Resistance (average depth of wear in inches, maximum)	ASTM C 944	-	0.04	0.04
Freeze-Thaw Durability (relative dynamic modulus of elasticity after 300 cycles, minimum)	ASTM C 666Proc. A	80%	80%	80%
Chloride Permeability ² @56-days (coulombs, maximum)	AASHTO T 277	1000	1000	1000
Compressive Strength ³ @ 56-days (pounds per square inch, minimum)	AASHTO T 22	5400	5400	6000
Water-Cement Ratio (maximum)	-	0.40	0.40	0.40
Creep @ 180 days (microstrain / psi, maximum)	AASHTO C 512	-	-	0.31
Modulus of Elasticity @ 28 days (psi, minimum)	ASTM C 469	-	-	$6x10^{6}$
Shrinkage (length change in microstrains, maximum @ end of testing)	ASTM C 157	-	-	600

- 1. For the scaling resistance testing, moist cure specimens for 14 days and then air cure for 14 days.
- 2. If the chloride permeability requirement has been achieved in 28 days, consider the chloride permeability acceptable. If the required chloride permeability is not achieved in 28 days, test the HPC sample at 56 days.
- 3. If the compressive strength requirement has been achieved in 28 days, consider the strength acceptable. If the required compressive strength is not achieved in 28 days, test the HPC samples at 56 days.

903.05.04 Control and Acceptance Testing Requirements

THE FIRST PARAGRAPH IS REPLACED WITH THE FOLLOWING:

With the exception that the ME may perform compression testing at 56 days, the ME will enforce the requirements specified in 903.03.05 for control and acceptance testing of non-pay adjustment Class A concrete in the fabrication of all Concrete Bridge, HPC elements, except for Prestressed Concrete Deck Panels, HPC.

With the exception that the ME may perform compression testing at 56 days, the ME will enforce the requirements specified in 903.03.05 for control and acceptance testing of non-pay adjustment Class P concrete in the fabrication of Prestressed Concrete Deck Panels, HPC

TABLE 903.05.04-1 IS REPLACED WITH THE FOLLOWING TABLE:

Table 903.05.04-1 Acceptance Requirements for HPC					
		Requirements			
Performance Characteristic	Test Method	HPC-1 AND HPC-2	HPC-3		
Percent Air Entrainment ¹	AASHTO T 152	6.0 ± 1.5 (No. 57/67 Aggregate) 7.0 ± 1.5 (No. 8 Aggregate)	5.0 ± 1.5 (No. 57/67/#8 Aggregate)		
Slump (inches) ^{1,2}	AASHTO T 119	3 ± 1	2 ± 1		
Chloride Permeability ² @56-days ^{3,4} (coulombs, maximum)	AASHTO T 277	2000	2000		
Compressive Strength ³ @ 56-days	AASHTO T 22	4400	5400		

(pounds per square inch, minimum)

- 1. If using a Type F or G admixture, change the Slump and Air Content values for the HPC as follows:
 - 1.1 Slump: 6 ± 2 inches
 - 1.2 Air Content: increase both the target value and tolerance percentages by 0.5
- 2. For slip-formed parapet, design and produce a mix with a slump of $1 \pm 1/2$ inch.
- 3. The ME will not test for the chloride permeability requirements for HPC used for Items other than bridge decks.
- 4. For chloride permeability testing, the ME will mold 4 additional cylinders, taking 2 cylinders each from 2 randomly selected delivery trucks for testing at 28-day and 56-day intervals.
- 5. For compressive strength testing, the initial rate for the HPC is 6 per lot. The retest limit is 4400 pounds per square inch for HPC-1 and HPC2, and 5400 pounds per square inch for HPC-3.

SECTION 904 – PRECAST AND PRESTRESSED CONCRETE

904.01.02 Fabrication

THE LAST SENTENCE OF PART 2 IS CHANGED TO:

If using SCC, minimize or eliminate the use of vibrators to prevent segregation.

904.02.06 Quality Control and Acceptance Requirements

STEP 2 IN THE THIRD PARAGRAPH IS CHANGED TO:

2. Dimensions not conforming to the tolerances specified in Table 904.02.02-1.

SECTION 905 – REINFORCEMENT METALS

905.01.03 Welded Wire Reinforcement

THE SECOND PARAGRAPH IS CHANGED TO:

When approved as an alternate to galvanized reinforcement bars, use galvanized welded wire reinforcement that meets the requirements of ASTM A 641, Table 1, Class 1.

905.01.05 Dowels

THE ENTIRE SUBPART IS CHANGED TO:

Use plain reinforcement bars according to ASTM A 615, Grade 60. Galvanize according to ASTM A 123.

905.03.03 Dowel Bars

THE FIRST PARAGRAPH IS CHANGED TO:

For dowel bars in transverse joints, use epoxy-coated, Grade 60, plain reinforcement steel according to ASTM A 615. If shown on the Plans, use dowel bars fitted with end caps. Ensure that the end caps are non-metallic and designed to prevent the entrance of grout or mortar into the expansion void.

SECTION 909 – DRAINAGE

THE FOLLOWING SUBPART IS ADDED:

909.02.09 Fiberglass Pipe for Bridge Storm Drainage

Fabricate fiberglass pipe conforming to ASTM D2996, RTRP-12EA1-2122 and fiberglass pipe fittings conforming to ASTM D3840.

Ensure that all fiberglass pipe, fittings and adhesives use pigmented resin throughout the wall and the color is concrete gray or designated color with UV stabilized resin. Painted gel-coat or exterior coating is not acceptable.

Ensure that adhesives are in accordance with the pipe manufacturer and adhesive manufacturer's recommendations.

SECTION 910 - MASONRY UNITS

SECTION 911 – SIGNS, SIGN SUPPORTS, AND DELINEATORS

911.02.02 Breakaway Sign Supports for Ground Mounted Signs

THE ENTIRE SUBPART IS CHANGED TO:

Fabricate and construct breakaway sign supports for ground mounted signs using materials conforming to the requirements in Table 911.02.02-1.

Table 911.02.02-1 Materials for Breakaway Sign Supports					
Item	Test Method	Type or Grade	Galvanizing		
Aluminum Materials (other than bracket)	911.01.01				
Bracket	B308	6061-T6			
Structural steel shapes	ASTM A709	Grade 36	ASTM A123		
Steel Sheet	ASTM A1011	Grade 36	ASTM A 653		
Bolts (except special bolt for coupling)	ASTM A325		ASTM A153		
Special bolt for coupling	ASTM A449		ASTM A153		
Cap Screw	ASTM A307		ASTM A153		
Lock Washer	ANSI B18-21-1		ASTM A153		
Nut	ASTM A563	Grade DH	ASTM A153		
Coupling	AMS 6378 F		ASTM A153		
Steel Hinge Plate	AISI 4130		ASTM 123		
Anchor Rod	AISI 1045				
Anchor Coil	AISI 1008				
Anchor Washer	908.04				
Anchor Ferrule	908.04				

Submit mill certificates for the component materials.

911.02.03 Non-Breakaway Sign Supports for Ground Mounted Signs

THE TEXT OF THIS SUBPART IS DELETED.

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911.03 FLEXIBLE DELINEATORS

1. Delineator Dimensions.

b. Guide Rail Mounted.

THE ENTIRE TEXT IS CHANGED TO:

Ensure that the unit for beam guide rail mounted flexible delineators has a minimum width of 3 inches and a minimum thickness of 0.100 inch. Use units of a height that will ensure that the top of the reflective area is 5 ± 2 inches above the top of post.

Design the base of the unit to mount over the I-beam blockout or to the top of a wood or synthetic blockout, of the beam guide rail.

c. Barrier Curb Mounted.

THE ENTIRE TEXT IS CHANGED TO:

For barrier curb mounted flexible delineators, use a delineator that is $3-1/2 \times 3-1/2$ inches, with a minimum thickness of 0.100 inch, and that has a base that forms a "T" shape with the panel for mounting on the side of the barrier curb, and is flexible or hinged so as to return to its original position after being struck.

THE FOLLOWING IS ADDED:

d. Construction Barrier Curb Mounted. For construction barrier curb top mounted flexible delineators, use a delineator that is 6 x 12 inches with a minimum thickness of 0.100 inch. For construction barrier curb side mounted flexible delineators, use a delineator that is 3-1/2 x 3-1/2 inches with a minimum thickness of 0.100 inch, and that has a base that forms a "T" shape with the panel for mounting on the barrier curb and is flexible or hinged so as to return to its original position after being struck.

4. Retroreflective Sheeting.

b. Guide Rail Mounted.

THE ENTIRE TEXT IS CHANGED TO:

Ensure that the sheeting is a minimum of 3 inches square and is mounted on the upper portion of the delineator.

THE FOLLOWING IS ADDED:

d. Construction Barrier Curb Mounted. Ensure that the sheeting for top mounted flexible delineators is 6 x 12 inches and the sheeting for side mounted flexible delineators is 3-1/2 x 3-1/2 inches.

Submit a certification of compliance, as specified in 106.07, for delineators.

SECTION 912 – PAINTS, COATINGS, TRAFFIC STRIPES, AND TRAFFIC MARKINGS

912.03.01 Epoxy Traffic Stripes

B. Glass Beads.

THE FOLLOWING IS ADDED TO THE FIRST PARAGRAPH:

Ensure that glass beads do not contain more than 200 ppm of lead, 200 ppm of antimony, or 200 ppm of arsenic.

912.03.02 Thermoplastic Traffic Markings

THE FOLLOWING IS ADDED TO THE FIRST PARAGRAPH:

Ensure that glass beads do not contain more than 200 ppm of lead, 200 ppm of antimony, or 200 ppm of arsenic.

912.04.01 Latex Paint

THE FOLLOWING IS ADDED TO THE SECOND PARAGRAPH:

Ensure that glass beads do not contain more than 200 ppm of lead, 200 ppm of antimony, or 200 ppm of arsenic.

SECTION 913 – GUIDE RAIL, FENCE, AND RAILING

913.01.05 Miscellaneous Hardware

SUBPART 3 OF THE FIRST PARAGRAPH IS CHANGED TO:

3. Use plates for guide rail on bridges and buried guide rail terminals conforming to ASTM A 36 and galvanized according to ASTM A 123.

SECTION 914 – JOINT MATERIALS

914.04.01 Preformed Elastomeric (Compression Type)

B. Joint Sealer.

THE LAST SENTENCE OF THE SECOND PARAGRAPH IS CHANGED TO:

If splicing of a sealer is allowed, ensure that the sealer at the splice point has no significant misalignment at its sides or top and that misalignment at the bottom does not exceed half of the bottom wall thickness.

SECTION 917 - LANDSCAPING MATERIALS

917.10 PLANT MATERIALS

B. Quality Requirements.

1. Trees.

THE FOLLOWING IS ADDED:

- 6. Trees designated as specimen quality on the landscape plan sheets will have the following characteristics:
 - a. Same height for all trees within each species
 - b. Trunks have less than 5 degree bow
 - c. Branched 6 feet for Prunus & Pyrus; branched 7 feet for Tilia; branched equal height for Acer
 - d. No scaffold branch located directly above another
 - e. Scaffold branches spaced at least 4-6"apart both radially and vertically along the trunk.
 - f. 60 inches diameter minimum canopy spread for Tilia (3-3.5" caliper specimen quality trees)
 - g. 48 inches diameter minimum canopy spread for Prunus (2-2.5" caliper specimen quality trees)
 - h. Obtained from a nursery specializing in specimen trees

H. Inspection.

THE SECOND PARAGRAPH IS CHANGED TO:

The Department may inspect plant materials before delivery to the Project Limits and upon delivery to the Project Limits before installation. The Department may seal the inspected plant materials. For plant material originating from nurseries farther than 100 miles from the Project Limits, stock plant material at a Contractor-provided holding yard that is acceptable to the Department. The Department may inspect plant material originating from nurseries within 100 miles of the Project Limits at the nursery. Ensure that all plant material is untied and located so that trunk or stem and branch structure can be easily inspected. Provide sufficient notice to allow Department inspection at the nursery or holding yard and to allow time for Contractor reordering of rejected material. Notify the RE at least ten (10) days in advance of delivery to the Project Limits for installation. The Department will reject materials arriving with broken or missing seals, broken or loose balls, broken or pruned leaders, insufficient protection, or that have been damaged in transit. The Department may randomly inspect the root system of the plant material by breaking open the earth balls. Provide necessary assistance during Department inspections.

SECTION 918 – ELECTRICAL MATERIALS

918.01 CONDUIT AND FITTINGS

4. Flexible Nonmetallic Conduit.

THE FOLLOWING IS ADDED:

For colored conduits (other than black and natural) ensure the "X" designation as part of the Cell Classification under Section 6.2 of ASTM D 3350 is "E".

For ITS Conduit Type ___, one of the conduits that is designated for electrical use is to be extruded integrally colored red to indicate its use for Electrical wiring.

918.12 PEDESTALS, POLES, TRANSFORMER BASES, AND MAST BRACKET ARMS

THE FIRST SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

Fabricate pedestals, poles, transformer bases, and mast bracket arms for traffic signal, highway lighting, and camera standards with materials according to the appropriate ASTM standard and the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

918.30 CCTV CAMERA

The purpose of these specifications is to describe minimum acceptable design and installation requirements for this equipment.

1 **GENERAL**

- A. Provide and install a color CCTV camera on the support structure as per contract plans.
- B. Configure the CCTV camera to transmit video image of a nominal width-to-height (horizontal-to-vertical) aspect ratio of 4:3, of full NTSC (480 lines) frame size and at a frame rate of up to 30 frames per second (FPS).
- C. Configure the CCTV camera for up to twelve Pan-Tilt-Zoom (PTZ) preset combinations (presets) at viewing positions as will be defined by the Department during commissioning.
- D. Provide complete CCTV Camera system that proceeds automatically to full functional mode without the need for any human intervention when related electrical power supply is turned on or restored.
- E. Provide and configure video management software designed specifically for the camera- encoder combination used on this project.
- F. Configure and integrate the camera into the existing video-management system at the related TMCs. Configure subtitle for each camera view position and preset. Display subtitles with the associated video image. Include the camera number, and a brief description for the covered area (horizontal angular bearing, and elevation angle) in the subtitles.
- G. Provide all components necessary for a fully functional CCTV camera such as cables, connectors, and all required camera components as specified in the following sections. These items will be incidental to the CCTV camera item.

2 CCTV CAMERA

- A. Provide CCTV camera meeting the following requirements:
 - 1) Optical zoom power of minimum 35X.
 - 2) Electronic zoom power of minimum 12X.
 - 3) Generate useable color image under site illumination of 0.8 Lux or higher, and black-white image under site illumination of 0.1 Lux or higher, without reliance on infrared lighting. Automatically switch between full color and monochrome (gray scale) mode under respectively regular and low light conditions.
 - 4) Integral Pan-Tilt-Zoom (PTZ) System.
 - 5) Dome-style environmentally sealed camera housing.
 - 6) Full-color.
 - 7) Compatible with NTCIP 1205 standard, ratified version 1.08 or later. Furnish PTZ system that provides feedback signal regarding the PTZ positions of the camera.
 - 8) Capable of attachment to the camera lowering device
 - 9) Electronic image stabilization capabilities.
 - 10) Equip housing with sun shield to reduce the heating effects of direct sunlight.
 - 11) Conform to EIA 170 and EIA ANSI/EIA-330 specifications.
 - 12) Solid state electronic components and circuits.
 - 13) Signal-to-noise ratio at 2.5-lux sensor illumination no less than 50 dB unweighted.
 - 14) Generate video images that exhibit no geometric distortion and are free of blemishes as defined by EIA 330.

- 15) Generate video signal with 75-Ohm impedance, and equipped with a BNC connector for external connection.
- 16) Operate without degradation in performance under temperature range of 14 to 131 degrees Fahrenheit, and relative humidity of lower than 95%, non-condensing, without auxiliary heating or cooling.
- 17) Equip camera with functionalities that limits bright light exposure and reduces image blooming.
- 18) Provide input for external sync. Automatically switch over to internal sync if external sync is not present. Provide capability to synchronize by line-locking to the AC power 60 Hz line frequency at the zero crossing point, and provide no less than plus or minus 90 degrees of vertical phase adjustment.
- 19) Equip camera with functionalities of through-the-lens white balancing, fixed white balancing, and automatic gain control.
- B. Provide camera that is hardened for long-term freeway deployment where it is typically subject to wide daily and seasonal temperature swings, wind gusts, typical road vibrations.
- C. Provide camera that is equipped with a thermostat controlled electric heater. The heater shall be sized to keep the lens and dome surfaces free of condensation under an ambient (outside) temperature of down to -20 degrees Fahrenheit.
- D. Provide camera lens that meets the following requirements:
 - 1) Furnish glass with coated optics.
 - 2) Mount lens using C or CS mount, as supplied by the camera manufacturer. Provide back focus adjustment.
 - 3) Equip lens with an auto-iris mechanism.
 - 4) Provide circle of illumination to cover the image sensor evenly. Do not utilize lenses with an image format larger than the lens is designed to cover.
 - 5) Provide a maximum f-stop opening of f/1.2 or the maximum available for the focal length specified.
 - 6) Zoom Range/Focal Length of minimum 1:8 optical zoom range, and Focal length of maximum 4.1 at the lowest zoom setting.
 - 7) Aperture not larger than f1.2 at the lowest zoom setting.
 - 8) Equip lens assembly with motorized means for zoom and focus adjustments, with automatic focus system. Provide lens zoom speed less than 4 seconds end to end, and focus speed less than 4 seconds end to end.
 - 9) Equip lens with neutral density spot filter.
 - 10) Provide lens assembly which minimizes reflection, and does not cause a significant reduction in resolution towards the corners of the picture area.
 - 11) Provide lens which does not cause any loss in the contrast.
 - 12) Provide lens which does not have any visible pincushion and barrel distortion.
 - 13) Furnish the mechanical or electrical means to protect the lens motors from overrunning extreme positions.
 - 14) Equip lens with sun shield over the upper front part of the camera lens to reduce the possibility of direct sun glare onto the sensing elements in the camera. Provide adjustable shielding mechanism to accommodate different mounting positions of the camera.
- E. Provide Pan/Tilt/Zoom (PTZ) system that is capable of pan movement no less than 0 to 360 degrees, tilt movement no less than plus and minus 90 degrees, pan speed no less than 6 degrees per second, and tilt speed no less than 3 degrees per second. Provide PTZ system that is capable of supporting the camera, lens and housing specified. Size the PTZ system to accommodate the camera, lens and housing weight plus maximum wind loading encountered at the installation site. Equip PTZ system with heavy duty bearings, hardened steel gears, externally adjustable limit stops for pan and tilt, and mechanical, dynamic or friction brakes. Provide permanently lubricated PTZ mechanism. Protect motors from thermal or impedance overload damage. Equip PTZ system mechanism with electronic switches to limit angular travel.
- F. Provide PTZ system capable of at least 64 preset positions, with a positioning accuracy of plus or minus 1/2 degree. Include auto focus, auto iris, pan, tilt, and zoom functions in each preset position. Provide PTZ system with capability to scan between any two electronically-set limits, and to operate in the "tour" mode covering up to all presets in a user defined sequence.
- G. Provide environmentally sealed camera housing for the camera assembly. Construct housing to be dust and water tight, and fully operational in 100 percent condensing humidity. Design housing to provide the environment needed for camera operation, and keep the viewing window free of fog, snow, and ice. Construct housing of aluminum, stainless steel, or steel with a corrosion-resistant finish. Design housing to withstand winds of 100 miles per hour with a 30-percent gust factor, and to withstand vibration of up to 0.03 inch total excursion from 5 to 30 Hz, and peak random vibrations of 5G's from 30 to 1,000 Hz.

- H. Provide a CCTV camera with BNC female connector for video signal interface, and screwed terminals for serial PTZ data interface.
- I. Provide a CCTV camera with operating temperature range that is down to maximum 32 and up to minimum + 104 degrees Fahrenheit, and with operating humidity range this is up to minimum 90%, non-condensing.
- J. Provide industry-rated power supply module, detached or integral to the unit, rated for long-term operations at the top temperature range of related unit.

3 75-OHM COAXIAL CABLE

- A. Provide 75-Ohm coaxial cable for connection with the video port of related camera. The cables shall be supplied with appropriate connectors. Connector shall be BNC male type unless otherwise specified, or to suit connected device.
- B. Provide coaxial cable with copper braid shield that provides minimum 95% coverage, and with center conductor made of solid copper. Center conductor made of copper plated steel or aluminum is not acceptable.
- C. Provide coaxial cable that introduces less than 1 dB attenuation to the video signal over the installed length.
- D. Provide coaxial cable with operating temperature range of up to minimum +140 degrees Fahrenheit.
- E. Provide coaxial cable with insulation rating of minimum 300V.

4 <u>VOLTAGE SURGE SUPPRESSOR</u>

A. Provide transient voltage surge suppressor in related field terminal cabinet for power, video signal, and PTZ serial signal for the cables connected to the camera.

5 INSTALLATION

- A. Where camera is pole mounted, orient support arm perpendicular to the adjacent roadway, with the camera positioned closer to the related roadway than the pole.
- B. Use only crimp type BNC connector on coaxial video cable.
- C. Supply all signal and control cables between a camera assembly and field terminal cabinet that are comprised of single continuous runs without splices.
- D. For installation of camera cable (cables) through a hollow pole, make provision to keep the vertical cable run within the pole taut, with slight slack to allow for cable shrinkage, to minimize possibility for entanglement with any other electrical or mechanical cables within the same pole. Provide strain-relief mechanism to the cable in vertical runs exceeding 60 feet, at minimum 60-foot interval.

6 INSTRUCTIONS AND GUARANTEES

- A. Provide ten sets of installation and user manuals with the furnished products.
- B. No changes or substitutions in these requirements will be acceptable unless authorized in writing. Inquiries regarding this specification shall be addressed to the Manager, Office of ITS Engineering, New Jersey Department of Transportation, P.O. Box 613, 1035 Parkway Avenue, Trenton, New Jersey 08625.
- C. Upon request by the Department, provide and deliver a sample of the CCTV camera, to the Office of ITS Engineering. Work performed on the sample shall meet all relevant requirements stated in this specification. The sample shall not be returned when related shop drawings are approved.
- D. Provide a two-year warranty for all installed and supplied products, with warranty period starting on the date that the installation is formally accepted by the Department. Thoroughly inspect the products prior to installation. The Contractor shall be fully responsible for the installation of defect-free products and for the replacement of any product found to be defective within the warranty period.

918.31 DIGITAL VIDEO ENCODER

The purpose of these specifications is to describe minimum acceptable design and installation requirements for this equipment.

1 GENERAL - I

- A. Provide a digital video encoder in the field terminal cabinet as per contract plans, which is compatible with the video viewing and management software currently in use at the TMC. Refer to specification EB-FTC-2 for requirements on the field terminal cabinet.
- B. Provide software suitable for use with MS Windows XP operating systems for configuring, managing and monitoring the unit.
- C. Configure the digital video encoder to transmit minimum two simultaneous video streams generated in different compression formats from the same analog video signal. One video stream shall be NTSC 4CIF (704 horizontal pixels, 480 vertical pixels) frame size and at a frame rate of up to 30 frames per second (FPS), the second video stream shall be NTSC 1CIF (352 by 240 pixels) frame size and at a frame rate of up to 3 FPS.
- D. Provide complete system that proceeds automatically to full functional mode without the need for any human intervention when related electrical power supply is turned on or restored.

2 DIGITAL VIDEO ENCODER - II

- A. 2-1 Provide a digital video encoder that digitizes analog NTSC video signal, performs video signal compression and converts it to a format suitable for transmission via Ethernet computer network. Provide a digital video encoder that processes bi-directional PTZ control data for peripheral components, encodes analog video and bi-directional PTZ control (response and command) signals from a CCTV camera, and covert them to and in a format suitable for transmission over an Ethernet-based networking platform. Performed encoding functions shall include compression of the network-bound video signals using the compression technology as specified further.
- B. 2-2 Provide a digital video encoder which is identifiable with an IP address in the Ethernet communications network.
- C. 2-3 Provide a digital video encoder that supports video compression protocols: MJPEG, MPEG4 part 2 simple-profile, and MPEG4 part 10 (H.264) Baseline Profile [Main Profile].
- D. Provide a digital video encoder that supports and complies with the following Network protocol and standards compatibility: Internet IP, TCP, UDP, ICMP, ARP, RTP, RTSP, DHCP, HTTP, SNMPv2and SNMPv2.
- E. Provide a digital video encoder that transmits minimum two simultaneous video streams generated in different compression formats from the same analog video signal. One video stream shall be NTSC 4CIF (704 horizontal pixels, 480 vertical pixels) frame size and at a frame rate of up to 30 frames per second (FPS), the second video stream shall be NTSC 1CIF (352 by 240 pixels) frame size and at a frame rate of up to 3 FPS.
- F. Provide a digital video encoder that transmits the 4CIF video stream listed above video in IP Multicast mode, supporting minimum 5 clients.
- G. Provide a digital video encoder that is equipped unit with password-protection measures against unauthorized Access.
- H. Provide a digital video encoder with 10BaseT RJ45 port for LAN Interface, BNC female connector for video signal interface, and screwed terminals for serial PTZ data interface.
- I. Provide a digital video encoder with operating temperature range that is down to maximum 32 and up to minimum + 104 degrees Fahrenheit, and with operating humidity range this is up to minimum 90%, non-condensing.
- J. Provide management and operation software for the proposed unit.
- K. Provide industry-rated power supply module, detached or integral to the unit, rated for long-term operations at the top temperature range of related unit.
- L. Provide applicable mounting kit; for installation in an EIA 19-inch equipment rack system, provide rack-mounting kit with provisions for front access only.

3 75-OHM COAXIAL PATCH CABLE - III

- A. Provide 75-Ohm coaxial patch cable for connection with the video port of related camera. The cables shall be supplied with appropriate connectors. Connector shall be BNC male type unless otherwise specified, or to suit connected device.
- B. Provide coaxial patch cable with copper braid shield that provides minimum 95% coverage, and with center conductor made of solid copper. Center conductor made of copper plated steel or aluminum is not acceptable.
- C. Provide coaxial patch cable that introduces less than 1 dB attenuation to the video signal over the installed length.

- D. Provide coaxial patch cable with operating temperature range of up to minimum +140 degrees Fahrenheit.
- E. Provide coaxial patch cable with insulation rating of minimum 300V.

4 <u>INSTALLATION - V</u>

A. Install the product in the field terminal cabinet.

5 INSTRUCTIONS AND GUARANTEES - VI

- A. Provide ten sets of installation and user manuals with the furnished products.
- B. No changes or substitutions in these requirements will be acceptable unless authorized in writing. Inquiries regarding this specification shall be addressed to the Manager, Office of ITS Engineering, New Jersey Department of Transportation, P.O. Box 613, 1035 Parkway Avenue, Trenton, New Jersey 08625.
- C. The Supplier agrees upon the request of the Manager, Office of ITS Engineering to deliver to the Office, a sample of the digital video encoder, to be supplied in compliance with these specifications for inspection and test before acceptance. The sample shall be returned when related shop drawings are approved.
- D. The supplied products shall carry a two-year warranty, from the date of project acceptance by the State, to be free of defects. The installer shall fully test the products prior to installation and within the warranty period. The installer shall be fully responsible for the installation of defect free products and for the replacement of any products found to be defective due to improper construction or improper installation for two years after the State's acceptance of the project.

918.32 ETHERNET NETWORK SWITCH

The purpose of these specifications is to describe minimum acceptable design and installation requirements for this equipment.

1 GENERAL

- A. Provide a managed network switch in related field terminal cabinet. Refer to specification EB-FTC-2 for requirements on the field terminal cabinet.
- B. Provide software suitable for use with MS Windows XP operating systems for configuring, managing and monitoring the switch.
- C. Configure the network switch to allow transmission from local devices shown on contract plans as being connected to the switch. Disable communication from all unauthorized devices.
- D. Configure the network switch to limit the access for viewing, issuing instruction, and performing configuration to authorized users only. Provide cabling and connectors to connect network switch to all electronic devices in the device enclosure which require LAN connectivity.
- E. 1-5 Provide complete system that proceeds automatically to full functional mode without the need for any human intervention when related electrical power supply is turned on or restored

2 ETHERNET NETWORK SWITCH

- A. Provide temperature-hardened ISO level-2 Managed Ethernet Switch with redundant FO trunk connections as per Contract Plans and as specified herein. In addition to the redundant FO ports, the network switches shall be equipped with minimum eight 10baseTx 100BaseTx (copper) local-area-network (LAN) ports.
- B. Switch design shall be fixed hardware configuration, stackable or chassis-modular hardware design. The units shall be capable of learning the MAC address of network devices attached to each port and optimizing data stream routing.
- C. Provide communication units of matching manufacturer/model at opposite ends of each communication link; use of different models for the same link is not permitted.
- D. Provide switch management and operation software for the proposed unit.
- E. Where possible with switch management configuration, inhibit all unnecessary communication paths among the network ports of the Ethernet switch to optimize usage of LAN communication bandwidth.
- F. Provide industry-rated power supply module, detached or integral to the unit, rated for long-term operations at the top temperature range of related unit.
- G. Provide applicable mounting kit; for installation in an EIA 19-inch equipment rack system, provide rack-mounting kit with provisions for front access only.

- H. Ethernet switch for video system shall be IP-multicast enabled type.
- I. Ethernet switches used in ring LAN architecture shall be managed type and comply with IEEE 802.1w rapid spanning tree standard.
- J. Backbone connections: primary and secondary (redundant) ports, minimum 2km distance via single-mode optical fibers.
- K. Address capacity: minimum 2000 MAC addresses with automatic address learning, migration, and fixed or variable address aging duration.
- L. Buffer: minimum 128kbytes SRAM, 4Mbytes DRAM.
- M. Redundant-Ring Recovery Time: maximum 300ms.
- N. Latency: maximum 8µsec @100mbps.
- O. Isolation: minimum 500 Volts RMS (for 1 minute).
- P. Functional standards: IEEE 802.3 full-duplex operation; 802.1p priority queuing, 802.1QVLAN, 802.3u, IP multicast filtering.
- Q. Temperature Range: down to maximum 32 and up to minimum +168 degrees Fahrenheit.
- R. Humidity Range: 5% to 95%, non-condensing.

Acceptable Product: Cisco High-temperature model.

3 10-Base-Tx NETWORK CABLE

- A. Provide low smoke zero halogen (LSZH) Un-shielded Twisted Pair Category-6 (Cat 6) LAN cables for all Ethernet 10BaseTx and 100BaseTX LAN connections. The cables shall be supplied with appropriate connectors. Connector shall be RJ-45 unless otherwise specified, or to suit connected device. The connector shall be wired in TIA/EIA T568B configuration unless otherwise specified or otherwise required for the connected device.
- B. Provide cable that meets or exceeds specifications of TIA/EIA568-B Category.6 cable.
- C. Cable conductors shall be minimum solid 23AWG, with DC resistance at 20 degrees centigrade of maximum 9.4 Ohms per 100 meters.
- D. Return loss shall be minimum 17dB @ 300MHz.
- E. ELFEXT shall be minimum 21dB @ 300MHz.
- F. NEXT shall be minimum 38dB @ 300MHz.
- G. PSELFEXT shall be minimum 18dB @ 300MHz.
- H. PSNEXT shall be minimum 36dB @ 300MHz.
- I. Impedance shall be maximum 100 ± -33 Ohms @ 300MHz.
- J. Insertion Loss shall be maximum 35.7dB/100m @ 300MHz.
- K. Delay skew shall be maximum 25nsec/100m @ 300MHz.
- L. Operating in temperature: up to minimum +140 degrees Fahrenheit.
- M. Insulation voltage rating shall be minimum 300V

4 TESTING

- A. Test this item as part of the communications system established with the infrastructure as per contract plans.
- B. Provide all personnel, equipment, instrumentation and materials necessary to perform all testing.

5 INSTALLATION

A. Install the product in the field terminal cabinet.

6 INSTRUCTIONS AND GUARANTEES

- A. Provide ten sets of installation and user manuals with the furnished products.
- B. No changes or substitutions in these requirements will be acceptable unless authorized in writing. Inquiries regarding this specification shall be addressed to the Manager, Office of ITS Engineering, New Jersey Department of Transportation, P.O. Box 613, 1035 Parkway Avenue, Trenton, New Jersey 08625.
- C. Upon request by the Department, provide and deliver a sample of the a sample of the network switch, to the Office of ITS Engineering. Work performed on the sample shall meet all relevant requirements stated in this specification. The sample shall not be returned when related shop drawings are approved.

D. Provide a two-year warranty for all installed and supplied products, with warranty period starting on the date that the installation is formally accepted by the Department. Thoroughly inspect the products prior to installation. The Contractor shall be fully responsible for the installation of defect-free products and for the replacement of any product found to be defective within the warranty period.

918.33 ENVIRONMENTAL FIELD TERMINAL CABINET

electronic and electrical components requiring environmental protection which are mounted in a 19 inch EIA (Electronic Industries Association) rack.

The purpose of these specifications is to describe the minimum acceptable design and construction requirements for this field terminal cabinet.

1 GENERAL

- A. Provide NEMA 3R rated cabinet constructed of a minimum of 0.125 inch thick 50-52-H32 aluminum alloy. The outside dimensions shall be 24" W x 66" H x 30" D. A double door, both front and rear, arrangement shall be utilized. The inside available space dimensions of the cabinet shall be at least 53.75" x 20.00" x 26.25".
- B. Provide and install an EIA (Electronic Industries Association) 19 inch rack inside the cabinet. The rack shall be finished with Universal Rack Hole Spacing. The rack shall be made of heavy duty 12 gauge type 304 stainless steel. The mounting holes shall be tapped with standard #10-32 threads spaced in accordance with EIA RS-310-C. Mounting holes shall be included on both sides of the cabinet. The rack shall be 55.25" x 20.00" x 20.75".
- C. Provide bolts, nuts, washers, screws of size 8 or larger, hinges and hinge pins made of stainless steel, unless otherwise specified. Incorporate stainless steel hinges and hinge pins for all cabinet doors. Make use of stainless steel pop-rivets or stainless steel nuts and bolts for fastening of hinges to doors and cabinets shall be made using. Do not weld hinges to cabinets and doors.
- D. Ensure that all surfaces of the cabinet are clean, free of holes or blemishes, smooth without burrs and with exterior corners rounded. Do not paint the cabinet.
- E. Equip the cabinet doors with a switch which will provide a contact closure indicating that the cabinet door is opened.
- F. Equip the cabinet, in the top front and rear of the cabinet, with a fluorescent fixture supplied with a lens or shield and a 15 watt Type T-12 lamp and rapid start, high power factor cold weather ballast. Provide a switch on the inside of the cabinet doors to disable the lamps when the doors are closed.
- G. Equip both cabinet doors with CCL 2-NJIVHS locks that allows removal of related key in locked position only. Supply one key with each lock.
- H. Equip the cabinet with a slide out shelf/drawer storage unit.
- I. Provide cabinet mounting pad with mounting pattern of 15" x 25" grid, consisting of oval bolt mountings of 2.00" x 1.00".
- J. Provide insulation, heating and cooling measures with or within the cabinet that will maintain the environment inside the rack at a temperature range of 32 to +104 degrees Fahrenheit, assuming that the ambient outside temperature is within the range of -13 to +140 degrees Fahrenheit.
- K. Label all cabinet terminals, outlets, circuit boards, and other components using silk screening or a similar permanent process.
- L. These items will be incidental to the field terminal cabinet item. Provide all components necessary for a fully functional environmental field terminal cabinet such as cables, connectorized pigtails, connectors, and all required cabinet components as specified in the following sections. These items will be incidental to the field terminal cabinet item.

2 SURGE SUPPRESSOR

A. Provide UL1449 listed IEEE C62.41 Zone B surge suppressor (surge protector) for the incoming power and communications cables, except for the fiber optic cables. The surge suppressors shall be of design specific for the type and voltage of the related service. For the 120V power cable, the surge suppressors shall provide suppression for both normal mode (L-N) and common mode (L-G and N-G) protection. The surge suppressor for 120V power shall incorporate a series choke at a maximum clamp voltage of 340 volts at 20 kiloamps with a

- 5 nanosecond response. In addition, the surge protector shall have the capability of removing high energy surges and block high speed transients.
- B. The surge suppressor for 120V power shall comply with the following specifications:
 - 1) Peak Current: 20,000 amps (8x20 µs waveshape)
 - 2) Occurrences: 20 times at peak current
 - 3) Minimum Series Inductance: 200 micro henries
 - 4) Continuous Series Current: 10 amps
 - 5) Temperature Range: -40 to +185 degrees Fahrenheit
- C. Install all surge suppression devices at locations where they are readily accessible for ease of replacement.
- D. Provide a radio interference filter with a minimum rating of 50 amps for the incoming power lines, in series with related surge suppressor.

3 POWER DISTRIBUTION ASSEMBLY

- A. Provide and label three copper ground bars for grounding terminations for AC neutral, chassis and logic ground. Install the ground bars for AC neutral and logic on insulators. Provide a fourth copper ground bar on insulator on the lower portion of the power panel, intended for field wiring. Connect this copper ground bar via a 10AWG wire to the AC neutral.
- B. Provide ground bars each equipped with at least 12 terminals designed for terminating two 10AWG wires.
- C. Space the ground bars at least 1-1/2 inches apart.
- D. Terminate all subpanel power cables directly to the power panel.
- E. Provide dual terminal blocks rated at 50 amps for incoming power. These terminal blocks shall have a minimum barrier height of 3/4 inch and utilize 10-32 x 5/16 inch screws.
- F. Power Distribution
 - 1) Include the following in the power distribution panel:
 - i. Duplex NEMA 5-15R Receptacle
 - ii. Duplex NEMA 5-15R Equipment GFI Receptacle
 - iii. One 1-Pole 50 amperes minimum, 120 volts AC Main Circuit Breaker
 - iv. One 6-Pole Ganged, 15 amperes, 120 volts AC Signal Bus Circuit Breaker
 - v.One Mercury Contactor rated minimum 60 amperes, 120 volts AC
 - vi. Terminal blocks as required
 - 2) Breaker Rating Label
 - i.Provide labeling for breaker rating on the face of breaker or handle. Provide labeling for breaker function below the breakers on the front panel.
 - 3) Ground Fault Receptacle
 - i. Provide for the first receptacle in the circuit shall receptacle with ground-fault circuit interruption as defined in the National Electrical Code.
 - 4) Conductors
 - i.Connect all conductors from the power distribution to the terminal block on the common side, except for the AC power conductor between the service terminal block and main circuit breaker. Connect all internal conductors terminating at the blocks to the other side of the blocks.
 - 5) Ganged Circuit Breakers
 - i. Provide ganged circuit breakers which are certified by the circuit breaker manufacturer that their circuit breakers shall gang trip.

4 FIELD CABINET CONSTRUCTION

- A. Basic Design
 - 1) Design the housing to be rainproof and with the top of the enclosure crowned to prevent standing water.
- B. Welding
 - Weld all exterior seams for enclosure and doors continuously and smooth. Fill all edges to a radius of 0.03125 inch minimum. Weld all external portions of the cabinets using gas Tungsten arc TIG process only. Use ER5356 aluminum alloy bare welding electrodes conforming to AWS A5.10 requirements for welding on aluminum. Conform to the requirements and practices in AWS B3.0 and C5.6 for aluminum for all procedures, welders and welding operators. Weld all internal portions of the cabinet using either gas metal arc MIG or gas tungsten arc TIG Process.

C. Door Frames

1) Provide door frames which double fang out on all four sides and equipped with strikers to hold tension on and form a firm seal between the door gasketing and the frame. The dimension between the door edge and the enclosure external surface of the enclosure, when the door is closed and locked, shall be 0.156 (±0.08) inch.

D. Gasketing

1) Provide dust-tight gasketing on all door openings. Provide closed cell neoprene gaskets which are minimum 0.25 inch thick and permanently bond them to the metal. Cover the mating surface of the gaskets with a silicone lubricant to prevent sticking to the mating metal surface. Provide a channel to support the top gasket on the door to prevent gravitational fatigue of the gasket.

E. Rack Cage Supports

1) Provide cage bottom support mounting angles on either side, level with the bottom edge of the door opening, for horizontal support and bolt attachment. In addition, provide side cage supports for the upper cage bolt attachments. Provide spacer brackets between the side cage supports and the cage which is minimum 0.188 inch thick for aluminum or minimum 0.105 inch thick for steel.

F. Door Handles

1) Make provision for padlocking the latching handles in the closed position. Provide stainless steel handles which are minimum 0.75 inch in diameter and equipped with a minimum 0.5 inch shank. The padlocking attachment shall be placed at 4 inches from the handle shank center to clear the lock and key. An additional 4 inch minimum gripping length shall be provided.

G. Latching Mechanism

1) Provide latching mechanism which is of a three-point draw roller type. The pushrods shall be turned edgewise at the outward supports and have a cross section of 0.25 inch thick by 0.75 inch wide, minimum.

H. Door Lock Operation

1) Provide door lock which is locked automatically when the door is closed and latched. Provide the locks and handles on the left side of the front door and right side of the rear door. Mount the lock and lock support rigidly on the door. In the locked position, the bolt throw shall extend a minimum of 0.25 ±0.03125 into the latch cam area. Provide sealing arrangement to prevent dust or water entry through the lock opening. Equip both cabinet doors with CCL 2-NJIVHS locks that allows removal of related key in locked position only. Supply one key with each lock.

I. Front Door

1) Provide front doors which are not louvered.

5 AIR CONDITIONER

- A. The air conditioner shall be a minimum of 1759 watts and shall not exceed the dimensions of 40" x 20" x 11". In addition, the unit must not exceed the depth of the cabinet.
- B. Mount the air conditioner unit to the side of the Field Terminal Cabinet
- C. Utilize a closed-loop cooling system which keeps the ambient air outside the enclosure. Provide a system that includes a hot gas by-pass valve to regulate cooling and prevent evaporator coil freezing during periods of low heat load and low ambient air temperature.
- D. Provide thermostat controlled circuit to operate the air conditioner only when required. Provide a thermostat with an adjustable set point of between +68 to +140 degrees Fahrenheit, and a dead zone (to turn off below the turn on set point) of 41 degrees Fahrenheit.
- E. Equip the unit with a solid state electronic noise suppresser to minimize EMI/RFI interference.
- F. Provide a temperature switch with contact closure to indicate a high temperature alarm. Provide a temperature switch with an adjustable set point of between +68 to +180 degrees Fahrenheit, and a dead zone of 5 degrees Fahrenheit.
- G. Provide a dedicated circuit breaker in the cabinet for the air conditioner service.

6 HEATER

H. Mount a 400 watt strip heater with integral fan on the cabinet side wall opposite to the one utilized for the air conditioner.

- I. Provide thermostat controlled circuit to operate the heater only when required. Provide a thermostat with an adjustable set point of between +14 to +41 degrees Fahrenheit, and a dead zone (to turn off below the turn on set point) of 41 degrees Fahrenheit.
- J. Provide a temperature switch with contact closure to indicate a low temperature alarm. Provide a temperature switch with an adjustable set point of between +5 to +60 degrees Fahrenheit, and a dead zone of 5 degrees Fahrenheit.
- K. Provide a dedicated circuit breaker in the cabinet for the heater service.

7 INTERNAL COMPONENTS

- A. Fasten all internal components securely to the enclosure using explicit mechanical means such as clamps, bolt/nut sets and screws. Include custom-designed mounting bracket for items not specifically designed for being fastened.
- B. Neatly bundle and label all wires/cables within the enclosure.
- C. Terminate drain wire from all electric devices, including surge suppressors, directly to the dedicated grounding terminal in the enclosure. Do not daisy-chain drain wires from device to device.
- D. Provide a maximum separation possible between signal wiring and power wiring or control wiring, to avoid inductive pickup. If power wiring has to cross the signal wiring, orient crossing as close to a right angle as possible. Run wires in open slot vinyl wire duct with covers. Hold wire duct to the back plate with nylon "push" type rivets. Where it is not practical to use wire duct, use wire ties to bundle the wires together in a neat and professional manor.

8 <u>INSTRUCTIONS AND GUARANTEES</u>

- A. Wiring Diagrams
 - 1) Provide one A1 size (22" X 36") reproducible blackline Diazo 4 mil thick mylar and two prints of the schematic wiring diagram for the cabinet wiring with each cabinet. Provide the diagrams in a heavy duty side opening clear plastic pouch and attach it to the front cabinet door. Use pouch of such design and material that provides adequate storage and access to the wiring diagram and manual. The diagrams shall be nonproprietary, and shall identify all circuits in such a manner as to be readily interpreted.
- B. Cabinet Manuals
 - 1) Provide two cabinet manuals in the pouch together with the wiring diagram sets.
- C. No changes or substitutions in these requirements will be acceptable unless authorized in writing. Inquiries regarding this specification shall be addressed to the Manager, Office of ITS Engineering, New Jersey Department of Transportation, P.O. Box 613, 1035 Parkway Avenue, Trenton, New Jersey 08625.
- D. Provide a two-year warranty for all installed control and auxiliary equipment, with warranty period starting on the date that the installation is formally accepted by the Department. Thoroughly inspect the units prior to installation. The Contractor shall be fully responsible for the installation of defect-free products and for the replacement of any product found to be defective within the warranty period. Document all tests or repairs made during warranty period on the supplied system documented on the New Jersey Department of Transportation "Equipment Failure Analysis and Report Form", and attach a copy of this form with the equipment. Include an explanation of the exact repairs made and identification of parts replaced by part number and circuit number in the form. Complete all warranty repairs and remedies within thirty days upon receipt of notification of such failure.
- E. Upon request by the Department, provide and deliver a sample of the equipment to be supplied to the Office of ITS Engineering. Work performed on the sample shall meet all relevant requirements stated in this specification. The sample shall be returned when related shop drawings are approved.
- F. Furnish any and all equipment which they deem necessary for safe and reliable field operation of the equipment.
- G. Furnished only equipment of current production and of recent manufacturer for all equipment under this specification. Do not include untried or prototype units.
- H. Identify all major components with a metal plate containing the serial number with a bar code identification.

918.34 PATCH PANELS

Specifications for Fiber Optic Cable Patch Panels for 6, 24, 48 and 96 fiber connections.

The purpose of these specifications is to describe minimum acceptable design and installation requirements for this equipment.

1 GENERAL

- A. Provide fiber optic patch panel designed for the termination of single mode fibers with ST type connectors.
- B. Comply with all applicable Electronic Industry Standards (EIA/TIA), International Telegraph and Telephone Consultative Committee (CCITT), ANSI, ASTM standards and FDDI specifications for the installation, termination and testing of the fiber optic patch panels, and attached cables.

2 PATCH PANEL CHARACTERISTICS

- A. Provide fiber optic patch panel equipped with termination plates which are designed for six terminations per plate. Provide ST type couplers mounted on the termination plates for patch panel for 6 fibers. For larger patch panels, provide ST type connectors mounted on the termination plates.
- B. Provide fiber optic patch panel equipped with as many termination plates as needed to terminate all fibers of the related fiber-optic trunk cables. Provide fiber optic patch panel designed to house at least three termination plates.
- C. Provide only ST-type fiber optic couplers/connectors equipped with pre-radiused Zirconia ceramic ferrule.
- D. Provide fiber optic couplers/connectors with insertion loss of maximum 0.35 dB each.
- E. Provide fiber optic couplers/connectors with signal return reflection of minimum 40 dB each.
- F. Provide fiber optic couplers/connectors with a worst case durability change (increase in insertion loss) of maximum 0.2 dB per 500 mating cycles.
- G. Provide fiber optic couplers/connectors with a minimum pull out strength of 50 pounds.
- H. Provide product with designed operating temperature range of down to maximum -40 and up to minimum +176 degrees Fahrenheit.
- I. Provide the following accessories in each fiber optic patch panel:
 - 1) Mounting bolts
 - 2) Plastic cap on all un-terminated couplers/connectors
 - 3) Jumper cables as further specified below
 - 4) Fiber drawers for patch panels for 24 or more fibers
 - 5) Cable clamps with strain relief.
- J. Provide patch panel constructed from sheet metal of minimum 24 gauge, painted gray which is suitable to direct mounting on a standard EIA 19 inch rack, patch panels for 24 or more fibers. Patch panel for 24 fibers shall not exceed 6 inches in height and 18 inches in depth. Patch panel for 48 fibers shall not exceed 11 inches in height and 18 inches in depth.
- K. Patch panel for 24 or more fibers shall have a front cover that shall be easily removed or opened by use of a hinge and/or fastened with thumbscrews to provide easy access for cable installation. The bottom and/or back shall provide openings for cable entrance, and provide for strain relief at each entry point. The patch panel shall provide drawers and other fixtures as required to maintain the cable fibers at more than minimum bending radius without strain placed on the cable.
- L. Provide, within each patch panel, 10-foot single-mode fiber optic jumper (patch) cables which are provided with factory installed ST type connectors:
 - 1) 4 jumper cables for patch panel terminating 6 fibers
 - 2) 12 jumper cables for patch panel terminating 24 fibers
 - 3) 24 jumper cables for patch panel terminating 48 fibers
 - 4) 48 jumper cables for patch panel terminating 96 fibers

3 COLOR CODING AND LABELING

A. Provide single mode connectors and couplers with a yellow collar on the body and/or boot.

4 INSTRUCTIONS AND GUARANTEES

- A. Supply one set of complete installation and use manuals, assembly plans and instructions.
- B. No changes or substitutions in these requirements will be acceptable unless authorized in writing. Inquiries regarding this specification shall be addressed to the Manager, Office of ITS Engineering, New Jersey Department of Transportation, P.O. Box 613, 1035 Parkway Avenue, Trenton, New Jersey 08625.

- C. Upon request by the Department, provide and deliver a sample of the of each type of patch panel to the Office of ITS Engineering. Work performed on the sample shall meet all relevant requirements stated in this specification. The sample shall be returned when related shop drawings are approved.
- D. Provide a two-year warranty for all installed and provided products, with warranty period starting on the date that the installation is formally accepted by the Department. Thoroughly inspect the units prior to installation. The Contractor shall be fully responsible for the installation of defect-free products and for the replacement of any product found to be defective within the warranty period.

918.35 FIBER OPTIC FUSION SPLICE AND SPLICE ENCLOSURE

The purpose of these specifications is to describe minimum acceptable requirements for this item.

1 GENERAL

- A. Fusion splice fibers in a fiber optic trunk cable as per Contract plans.
- B. Encase the splices in a splice enclosure at all locations identified in the contract documents.
- C. Provide the numbers and enclosure sizes required to contain all fibers involved, and any spare capacity as indicated for each splice location in the contract documents.
- D. The construction and testing of the fiber optic splices and splice enclosures shall comply with all applicable Electronic Industry Standards (EIA/TIA), International Telegraph and Telephone Consultative Committee (CCITT), ANSI, ASTM standards and FDDI specifications.

2 SPLICE CHARACTERISTICS

- A. In case of fiber-optic cable containing multiple buffer tubes, do not open the buffer tubes in which none of the enclosed optical fibers is involved in the specified splice work for related splice enclosure.
- B. Pass all fibers shown on the plans as not requiring any splice or termination work through the splice enclosure without damage. Do not cut optical fibers which are not involved in the specified splice work for related splice enclosure. Unless specifically otherwise specified, leave all unused optical fibers uncut.
- C. Coil neatly all fiber slacks, including all unused optical fibers, and store them in related splice tray(s).
- D. Use only fusion type splicer for performing splices. Splices using mechanical means are not permitted. The splicer unit shall be portable and operable using external 120VAC or internal battery power. The splicer unit must be able to splice fibers with 250 micrometer coating and 900 micrometer coating with little or no modification in the field. The splicer unit shall be capable of full battery recharge in an eight-hour charging period. The fusion splicer shall have the following capabilities:
 - 1) A. splice-protection-sleeve heater
 - 2) B. battery with charging unit and associated power cables,
 - 3) C. spare electrodes, fuses and lamps
 - 4) D. power meter/light source with carrying cases.

3 SPLICE ENCLOSURE CHARACTERISTICS

- A. The splice enclosure shall be air tight, water tight, corrosion resistant, rodent proof, and re-enterable.
- B. The splice enclosure shall be manufacturer certified for below ground, junction box (pull box) installation.
- C. The splice enclosure shall be no larger than 7 inches in diameter and no longer than 30 inches (nominal) long. Small junction boxes or enclosures may require a smaller splice case, for which the splice case shall be approximately 22.5 inches long, 5.5 inches wide, and 5 inches high (inner splice case shell dimensions).
- D. The splice case shall be designed and equipped with the necessary mounting hardware to be attached to the side of the junction box, and to be suspended vertically with sufficient clearance at each end for acceptable cable bends
- E. The splice enclosure shall be a complete kit including the following:
 - 1) A. Connection brackets
 - 2) B. Stand-off studs with locking nuts
 - 3) C. Grounding clamps
 - 4) D. Outer shell (usually in 2 halves)
 - 5) E. Inner shell assembly in two parts
 - 6) F. Splice trays with all required retainers and supports

- 7) G. Cable restraints
- 8) H. End plates (caps) as required
- 9) I. Inner shell supports
- 10) J. Outer shell clamp assemblies
- 11) K. Insulation/sealing tape
- 12) L. Resin filling cups and funnels
- 13) M. Resin encapsulant sealant
- F. The splice enclosure shall be designed so that the encapsulant sealant will fill the area between inner and outer shells and provide a moisture barrier. The sealant input method shall be by pouring in through sealable ports. The sealant shall be such that it is easily removed to provide for a re-enterable enclosure.
- G. The splice enclosure shall be designed so that the fiber optic cable shall enter the splice enclosure through the end plates. The end plates (or caps) of the splice enclosure shall be air and water tight, and shall form an air and water tight seal with the splice case body. Each end plate shall have factory installed cable entry inserts for two cables for securing the entering cables in an air and water tight seal. Fiber optic cables shall be restrained within the splice enclosure such that there is no discernible tensile force on the optical fiber.
- H. The splice enclosures shall have sufficient capacity to splice up to 144 optical fibers; although, the nominal maximum number of optical fiber splices is 48 per enclosure. In some cases one trunk cable fiber shall result in two fiber splices. This situation occurs whenever trunk cable fibers are spliced to termination cable fibers. The fibers in the trunk cable are cut and spliced to two termination cable fibers to provide a continuous path from the trunk cable, into the serviced item through the termination cable, and back out to the trunk cable fiber (and on to the next serviced item).
- I. Splice trays shall be provided in each enclosure for holding, protecting and organizing the optical fibers. Splice trays shall be all dielectric, provide sufficient space for coiling of optical fibers to prevent micro bending, and have capability to pass uncut/unaffected fibers through the enclosure. The placement of the bare optical fibers in the splice tray shall be such that there is no discernible tensile force on the optical fiber.
- J. A single splice tray shall be used for no more than the maximum number of optical fiber splices, depending on the manufacturer's specification. Sufficient splice trays shall be provided with each splice enclosure to accommodate the required splices.

4 TRAINING

- A. Prior to constructing the first splice unit, training shall be provided for the Department's engineering, maintenance and operations staff, at a facility provided by the Department. The training shall include all material and manuals required for each participant.
- B. Maintenance training of OTDR operation shall be provided for a minimum of 16 hours for at least 5 personnel with an electronics background. The training shall include operation instructions, theory of operation, circuit description, field adjustments, preventive maintenance procedures, troubleshooting, interpretation of results, and repair of all components.

5 INSTRUCTIONS AND GUARANTEES

- A. Supply one set of complete installation and user manuals, assembly plans and instructions with each five splice enclosures furnished.
- B. No changes or substitutions in these requirements will be acceptable unless authorized in writing. Inquiries regarding this specification shall be addressed to the Manager, Office of ITS Engineering, New Jersey Department of Transportation, P.O. Box 613, 1035 Parkway Avenue, Trenton, New Jersey 08625.
- C. Upon request by the Department, provide and deliver a sample of a completed spliced cable in a splice enclosure to the Office of ITS Engineering. Work performed on the sample shall meet all relevant requirements stated in this specification. The sample shall be returned when related shop drawings are approved.
- D. Provide a two-year warranty for all installed splice enclosures, and all enclosed splices and terminations, with warranty period starting on the date that the installation is formally accepted by the Department. Thoroughly inspect the units prior to installation. The Contractor shall be fully responsible for the installation of defect-free products and for the replacement of any product found to be defective within the warranty period.

918.36 SPLICING INTO EXISTING NETWORK CIRCUIT

The purpose of these specifications is to describe minimum acceptable requirements for performing this work.

1 GENERAL

- A. Specification EB-FOC-SPLC-5 is considered integral to this specification.
- B. The splice work will remove from service one segment of the redundant ring that supports the network. The redundant-ring circuit consists of two fiber pairs, one pair for the 'top-rung' and one pair for the 'bottom-rung' portion of the redundant ring. Fiber pairs in these two rungs may be routed through separate conduit runs, but in many cases they are "collapsed" into a common cable bundle. A network switch belonging to such a redundant-ring circuit is connected to the network through two redundant/alternative connections: via one fiber pair to the neighboring network switch at the upstream side, and via another fiber pair to the neighboring network switch at the downstream side. In such a system, network connectivity between any two network switch in the same system can take place via any of the two neighboring network switches. Connectivity between any two devices in such redundant-ring system is maintained if no more than one segment of the redundant ring is taken out of service.

2 PRE REQUISITES

Complete the following measure before starting splice work at a trunk cable containing an existing and functioning redundant-ring network circuit(s):

- A. Ensure that the existing redundant-ring network circuit is fully operational, that none of the network segments in the redundant-ring system is out of operation.
- B. Complete installation of all related fiber-optic branch cables and related FO equipment.
- C. Ensure that power is available to operate any newly added network switches which will need to be put in service immediately after the splice is performed.
- D. Complete termination of all fiber-optic cables in related equipment racks.
- E. Coordinate closely with the Department to schedule a suitable time to perform the splice work. Coordinate with the Department to have relevant IT/Network department personnel, during the scheduled work execution, monitor the conditions of the functioning optical circuits which may be impacted by the planned modification.
- F. Plan and prepare related work so the intended splices can be done and completed in as short time as possible.
- G. Have all tools, facilities, personnel and extra consumables necessary to make emergency splices in case of inadvertent damage to a functioning fiber circuit. Immediately restore continuity of any fiber which is inadvertently damaged during the splice process.
- H. Have all tools, facilities, personnel and consumables necessary to perform OLS and OTDR measurements on the splice fibers. Ensure that personnel, tools and communications devices required to conduct the tests at the equipment enclosure immediately upstream and downstream of the related splice location, and at the end of the new branch cable are available and ready to conduct the tests.
- I. Coordinate with the RE to have Department representative available to witness the OLS and OTDR tests.
- J. Prepare a check list that contains all relevant portions of the above requirements, and have the representative from IT/Network department, or others as assigned specifically by the Department, verify that all applicable portions of the above requirements are met.

3 SPLICING INTO EXISTING NETWORK CIRCUIT

Follow the following instruction for performing splice work at a trunk cable containing an existing, functioning redundant-ring network circuit(s):

- A. Perform such splice work only in a splice enclosure through which any of the fiber pairs which support the redundant-ring system.
- B. At all times, perform splice work on one of the two fiber pairs only, and complete all interconnections through related branch fibers. Do not proceed with splice work on the second fiber pair unless the optical circuit supported by the first fiber pair is completed, tested, and return to normal operation.
- C. Performance acceptance tests on the modified circuit supported by the fiber pair immediately after all related splice and termination works are completed. In case of unsatisfactory test results, rectify any problems and proof that the circuit pass all tests.

4 SUBMISSIONS AND TESTING

- A. Submit prerequisite check list as specified above for approval by the Department.
- B. Submit signal power budget calculations as per specification EB-FOC-SPC-5 on related fibers for approval by the Department.
- C. Perform Optical line loss (OLS) test and Bi-directional optical time-domain reflectometer (OTDR) tests on the related fibers, and submit related test documents as per specification EB-FOC-SPC-5.

918.37 INSTALLATION AND TERMINATIONS OF FIBER OPTIC CABLE

The purpose of these specifications is to describe minimum acceptable requirements for installing and terminating a fiber optic cable.

1 GENERAL

- A. Specifications EB-FOC-SPLC-1 is considered integral to this specification.
- B. Include article 704.03.03 and other articles referenced therein for other requirements.

2 CRITERIA

- A. A splice is considered acceptable if the insertion loss introduced by related splice is less than 0.15dB per splice.
- B. Termination of an FO strand to a connector pair is considered acceptable if the insertion loss is less then 0.75dB per mated connector pair. Termination of an FO strand to a single connector is considered acceptable if the insertion loss is less then 0.35dB per connector termination.
- C. A fiber strand with any optical event, as detected with related OTDR tests, which is greater than 0.1dB, and not caused by a planned splice or a planned connector termination, is considered unacceptable.

3 <u>REMEDIATION</u>

- A. Remove a splice and attempt a re-splice if related test results are not acceptable, subject to limitations imposed in article 704.03.03.
- B. Remove a connector and attempt a new termination with connector if related test results are not acceptable, subject to limitations imposed in article 704.03.03.
- C. Replace the FO cable or provide supplemental FO cable if the number of FO strands which are tested and found acceptable, is less than the required strand quantity.

4 SIGNAL POWER BUDGET

- A. Submit transmission signal power budget calculation sheet(s) for each fiber optic (FO) circuit segment involving FO communications interface units located in separate enclosures, supported with copy of the related manufacturer's data sheets showing related dB/dBm allowances. For the purpose of signal power calculation, an FO circuit segment between two FO communications interface units shall comprise of the transmitter port of the first FO communications interface unit, the receiver port of the second FO communications interface unit, FO circuit between the two ports, including related optical fiber, all FO connectors, FO pigtails, jumpers, and splices. Transmission signal power (dB) budget calculation shall include the transmitted power level, receiver sensitivity, and power losses introduced by all components of the FO circuit segment. Provide nominal operating margin of 3 dB for each FO circuit segment, unless the saturation ceiling threshold at the receiver requires a lower operating margin. If an active signal repeater or booster is used, the FO circuit segment upstream and downstream to this device is considered separately. The following budget components shall be included in the calculation:
 - 1) Transmitter power: +dBm
 - 2) Line loss: -dB/length, applicable length
 - 3) Splice losses: -dB
 - 4) Connector losses: -dB
 - 5) Jumper line losses: -dB total per jumper set, where applicable
 - 6) Accessory loss: -dB, for signal splitters, attenuators, etc., where applicable
 - 7) Repair margin: -dB, minimum 3 dB
 - 8) Receiver Sensitivity: -dBm

5 TESTING

- A. Perform Optical line loss (OLS) test and Bi-directional optical time-domain reflectometer (OTDR) tests on all optical circuits after completion of the installation. An optical circuit, for the purpose of defining this testing requirement, includes an FO strand, related connector at the two ends, and all other FO-circuit components between the two connectors, including related connectors, FO pigtails, and splices. For all spare (unused) FO strands, provide connector at the two ends, and perform the tests on each FO fiber, end to end. For FO cables required to be terminated in patch panel, perform the tests on each FO circuit segment, including the optical fiber, fusion splices, pigtails, and connectors.
- B. OLS test shall be performed on a close-looped test circuit consisting of the related fiber pair, a connectorized patch chord at the remote ends of the fiber pair. Bi-directional OTDR test shall be performed on a single-ended test circuit consisting of only one of the related fiber. Separate bi-directional OTDR test is required for each fiber. Test probes for both tests shall be terminated at the connector or fiber patch panel in the equipment enclosure closest to the splices.
- C. The OTDR shall have a printer capable of producing a verifying test trace with fiber identification, numerical loss values, the date and the operator's name. It shall also have provision to store the test results as electronic files, of at least ten tests and transfer the test results to a personal computer. Provide software for displaying and printing the generated test reports on a personal computer. The OTDR shall be capable of recording and displaying anomalies of 0.2 decibels as a minimum. Single mode fibers shall be tested at 1300 nanometers and 1550 nanometers. The OTDR shall be designed for use on single mode fiber at 1300 and 1550 nanometer wavelength, and shall be a field unit exhibiting the following characteristics:
 - 1) Dead zone: 49.2 feet or better
 - 2) Attenuation range: 15 decibels or better
 - 3) Distance range: 32,808.4 feet or longer
 - 4) Accuracy: \pm 6.6 feet
 - 5) Printer: must be capable of printer output internal storage.
- D. The power meter and light source shall be a calibrated pair that is portable, battery operated. The units will meet or exceed the following parameters for operation on single mode fiber:
 - 1) Operating wavelength: 1300 / 1550 nanometers
 - 2) Range: +3 to -45 dBm
 - 3) Measurement scale: dBm
 - 4) Accuracy: 0.5 dB or better
- E. Identify magnitude of all identifiable events shown on the test images.
- F. Submit reports on all tests, including copy of OTDR test images of individual fiber segment/circuit.
- G. A fiber strand is considered acceptable if related tests pass all of the applicable criteria listed under article 'CRITERIA'.

6 TRAINING

- A. Provide training for up to five participants on the use and interpretation of test results of the instruments and tools used in the OLS and OTDR tests, and on the interpretation of the signal budget calculations.
- B. Provide the training at a facility provided by the Department. Schedule the training within six week before the time the OTDR and OLS tests will be conducted. Provide all material and manuals required for each participant.
- C. Design the training intended for participants with background in electronics.

918.38 FIBER OPTIC CABLE - SINGLE MODE, LOOSE TUBE, SINGLE JACKET

The purpose of these specifications is to describe minimum acceptable design requirements for this equipment.

1 GENERAL

A. The Fiber Optic Cable described in this specification shall be all dielectric, single jacketed, gel filled, with loose tubes optimally protected from water infiltration, and contain single mode, dual-window (1300 nanometers and 1550 nanometers) fibers and shall conform to these special provisions.

B. The construction and testing of the fiber optic cable shall meet or exceed all applicable Electronic Industry Standards (EIA/TIA), International Telegraph and Telephone Consultative Committee (CCITT), ANSI, BELLCORE, ASTM standards and FDDI specifications.

2 TRUNK CABLE

- A. The fiber optic cable shall be all dielectric and have a single jacket with a maximum cable diameter of 0.5 inch. The number of fibers shall be as specified in contract documents.
- B. The optical fibers shall be contained within loose, gel filled buffer tubes. The loose buffer tubes shall be stranded around an all dielectric central strength member, cable core shall be saturated with a water blocking compound, and surrounded by a tensile strength member. A high or medium density polyethylene outer jacket shall provide for overall protection.
- C. The fiber optic cable shall include the following components:
 - 1) Color coded, single mode, optical fibers
 - 2) Buffer tubes, gel filled, color coded
 - 3) Central strength member
 - 4) Filler rods as required
 - 5) Stranding
 - 6) Core and cable gel flooding
 - 7) Core separator or binders
 - 8) Tensile outer strength member
 - 9) Ripcord
 - 10) HDPE or MDPE outer jacket, co-extruded colored stripe, coded and labeled
- D. The cable shall be manufacturer rated for 600 pounds maximum tensile loading during installation (also called loaded).
- E. The cable shall be manufacturer rated for 130 pounds maximum tensile loading for the unloaded application
- F. The cable shall be designed for a minimum bending radius of 20 times the cable diameter during installation.
- G. The cable shall be designed for a minimum bending radius of 10 times the cable diameter for unloaded application.
- H. The cable shall have a crush resistance of 220 newtons per centimeter (tested in accordance with FOTP-41).
- I. The cable shall have an impact resistance of 25 impacts (tested in accordance with FOTP-25) without exhibiting an average increase in attenuation greater than 0.20 decibels at 1550 nanometers. The cable jacket shall not exhibit evidence of cracking or splitting at the completion of the test.
- J. The cable shall withstand 25 cycles of mechanical flexing around a mandrel (tested in accordance with FOTP-104) not greater than 20 times the cable diameter at a rate of 30 ±1 cycles/minute without experiencing an average increase in attenuation greater than 0.10 decibels at 1550 nanometers. No outer cable jacket cracking or splitting shall be observed under 10X magnification.
- K. The cable twist test shall be tested in accordance with FOTP-85. A length of cable no greater than 13 feet in length shall withstand 10 cycles of mechanical twisting without exhibiting an average increase in attenuation greater than 0.10 decibels. The cable jacket shall not exhibit no cracking or splitting when observed under 10X magnification after completion of test.
- L. The cable shall have a minimum proof test stress of 100kpsi (tested in accordance with EIA-455-31A).
- M. The cable fluid penetration test shall be tested in accordance with FOTP-82. When a one meter static head or equivalent continuous pressure is applied at one end of a one meter length of filled cable for one hour, no water shall leak through the open cable end.
- N. The cable shall be tested for compound flow testing in accordance with FOTP-81. The filling and flooding compounds shall not flow from the filled fiber optic cable when tested for 24 hours at 149 °F.
- O. The cable shall meet or exceed the requirements of Paragraphs 2-8 through 2-14 with no average attenuation increase after being subjected to the testing defined.

3 FIBER CHARACTERISTICS

A. Each optical fiber shall be glass and consist of a doped silica core surrounded by concentric silica cladding. All fibers in the buffer tube shall be usable fibers which meet attenuation requirements and shall be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical, and environmental requirements of these specifications.

- B. The coating shall be a dual layered, UV cured acrylate. The coating shall be mechanically or chemically stripable without damaging the fiber.
- C. The cable shall comply with the optical and mechanical requirements over an operating temperature range of -40 to +158 degrees Fahrenheit.
- D. The required fiber grade shall reflect the maximum individual fiber attenuation, to guarantee the required performance of each and every fiber in the cable. For all fibers, the attenuation specification shall be a maximum attenuation for each fiber over the entire operating temperature range of the cable.
- E. Single mode fibers within the finished cable shall meet the following requirements:
 - 1) Type: Step Index
 - 2) Core diameter: 8.3 μm (nominal)
 - 3) Cladding diameter: $124 \mu m \pm 2.0 \mu m$
 - 4) Core to Cladding Offset: 1.0 μm
 - 5) Cladding Non-circularity: 2.0%
 - 6) Coating Diameter: $250 \mu m \pm 15 \mu m$
 - 7) Proof/Tensile Test: 100 kpsi, min.
 - 8) Attenuation:
 - i.@ 1310 nm: < 0.4 dB/km
 - ii.@ 1550 nm: < 0.4 dB/km
 - 9) Attenuation at the Water Peak: $< 2 \text{ dB/km} @ 1300 \pm 3 \text{ nm}$
 - 10) Chromatic Dispersion:
 - i.Zero Dispersion Wavelength: 1301.5 to 1321.5 nm
 - ii.Zero Dispersion Slope: 0.092 ps/(nm2•km)
 - iii. Maximum Dispersion: 3.3 ps/(nm•km for 1285 to 1 330 nm, <18 ps/(nm•km) for 1550 nm
 - 11) Cut-Off Wavelength: <1250 nm
 - 12) Mode Field Diameter: $9.3 \pm 0.5 \mu m$ at 1300 μm
 - 13) Macrobending Loss measured at 1550 nm on loose fiber of 100 turns of 75 mm diameter (tested in accordance with EIA-455-62), shall be less than or equal to: 0.1 dB @ 1310 nm, and 0.5 dB @ 1550 nm

4 COLOR CODING AND LABELING

- A. 4-1 Each optical fiber shall be distinguishable from others in the same buffer tube by means of color coding according to the following:
 - 1) fiber 1: Blue
 - 2) fiber 2: Orange
 - 3) fiber 3: Green
 - 4) fiber 4: Brown
 - 5) fiber 5: Slate
 - 6) fiber 6: White
- B. In cables containing multiple buffer tubes each buffer tube shall be distinguishable from others in the same cable by means of color coding according to the following:
 - 1) Buffer Tube 1 Blue
 - 2) Buffer Tube 2 Orange
 - 3) Buffer Tube 3 Green
 - 4) Buffer Tube 4 Brown
 - 5) Buffer Tube 5 Slate
 - 6) Buffer Tube 6 White
 - 7) Buffer Tube 7: Red
 - 8) Buffer Tube 8: Black
- C. Cables shall be distinguishable from each other by co-extruded stripe color coding and labeling, and shall have a co-extruded stripe according to the plans and special specifications. The entire outer jacket of the cable shall have a co-extruded stripe colored by industry standard coloring additive, not by an external applied coloring. The labeling shall be printed on the cable every meter. The label shall be in capital letters and the height of the lettering shall be approximately 2.5 millimeters. The marking shall be in a contrasting color to the cable jacket. The co-extruded stripe colors for the outer jacket shall be one of the following colors as designated in the contract documents:

- 1) Blue
- 2) Orange
- 3) Green
- 4) White
- 5) Red
- 6) Black

The cable color and label used for each specific cable shall be as designated on the contract documents.

- D. The colors shall be targeted in accordance with the Munsell color shades and shall meet EIA/TIA-598 "Color Coding of Fiber Optic Cables."
- E. The color formulation shall be compatible with the fiber coating and the buffer tube filling compound, and be heat stable. The colors shall not fade or smear or be susceptible to migration and it shall not affect the transmission characteristics of the optical fibers and shall not cause fibers to stick together.

5 BUFFER TUBES

- A. Clearance shall be provided in the loose buffer tubes between the fibers and the inside of the tube to allow for expansion without constraining the fiber. The fibers shall be loose or suspended within the tubes. The fibers shall not adhere to the inside of the buffer tube.
- B. Single jacketed cables shall have a minimum of 3 and a maximum of 6 buffer tubes with a maximum of 12 fibers in each tube. Number of fibers in each buffer tube shall be in accordance with the contract plans. Diameter of buffer tubes shall be a minimum of 2.0 millimeters and a maximum of 2.4 millimeters.
- C. The loose buffer tubes shall be extruded from a material having a coefficient of friction sufficiently low to allow free movement of the fibers. Buffer tubes shall be made of a tough abrasion resistant material to provide mechanical and environmental protection of the fibers, yet designed to permit safe intentional "scoring" and breakout, without damaging or degrading the internal fibers.
- D. Buffer tube filling compound shall be a homogenous hydrocarbon-based gel with anti-oxidant additives and used to prevent water intrusion and migration. The filling compound shall be non-toxic and dermatologically safe to exposed skin. The compound shall be chemically and mechanically compatible with all cable components, non-nutritive to fungus, non-hygroscopic and electrically non-conductive. The filling compound shall be free from dirt and foreign matter and shall be readily removable with conventional nontoxic solvents.
- E. Buffer tubes shall be stranded around a central member by a method that will prevent stress on the fibers when the cable jacket is placed under strain, such as the reverse oscillation stranding process.
- F. Each buffer tube shall be distinguishable from other buffer tubes in the cable by means of color coding as specified in Section VI.

6 CENTRAL NON-FIBER MEMBERS

- A. The central strength member, which functions as an anti-buckling element, shall be a glass reinforced plastic rod with similar expansion and contraction characteristics as the optical fibers and buffer tubes. A linear overcoat of Low Density Polyethylene shall be applied to the central member if required to achieve the optimum diameter to provide the proper spacing between buffer tubes during stranding.
- B. Fillers may be included in the cable to lend symmetry to the cable cross-section where needed. Filler rods shall be medium or high density polyethylene. The diameter of filler rods shall be the same as the outer diameter of the buffer tubes.

7 STRANDING

- A. Completed buffer tubes shall be stranded around the overcoated central member using stranding methods, lay lengths and positioning such that the cable shall meet mechanical, environmental and performance specifications.
- B. A polyester binding shall be applied over the stranded buffer tubes to hold them in place. Binders shall be applied with sufficient tension to secure the buffer tubes to the central member without crushing the buffer tubes.
- C. The binders shall be non-hygroscopic, non-wicking (or rendered so by the flooding compound), and dielectric with low shrinkage.

8 CORE AND CABLE FLOODING

- A. The cable core interstices shall be filled with a polyolefin based compound or equivalent to prevent water ingress and migration.
- B. The flooding compound shall be homogeneous, non-hygroscopic, electrically non-conductive, and non-nutritive to fungus. The compound shall also be nontoxic, dermatologically safe and compatible with all other cable components.

9 TENSILE STRENGTH MEMBER

- A. Tensile strength shall be provided by high tensile strength aramid yarns and fiberglass, which shall be helically stranded evenly around the cable core.
- B. The cable shall contain one ripcord, spaced apart under the jacket to provide for easy sheath removal.

10 OUTER JACKET

- \overline{A} . The jacket shall be free of holes, splits, and blisters and shall be high density cross-linked or medium density polyethylene with minimum nominal jacket thickness of 40 ± 3 mils.
- B. Jacketing material shall be applied directly over the tensile strength members and flooding compound and shall not adhere to the aramid strength material.
- C. The outer jacket material shall be co-extruded stripe color coded and labeled according to the color code in Section IV.
- D. The jacket material shall contain a suitable antioxidant, and shall not promote the growth of fungus.
- E. The jacket shall be marked with the manufacturer's name, the words "Fiber Optic Cable", date of manufacture, and sequential measurement markings every meter. This is in addition to the labeling in Section IV, Subsection 4-3. The actual length of the cable shall be within ± 1 percent of the length marking. The marking shall be in a contrasting color to the cable jacket. The height of the marking shall be approximately 2.5 millimeters.
- F. High or medium density polyethylene shall be in accordance with ASTM D 1248, Type II or III, class C, category 4 or 5 and shall contain a suitable antioxidant system. The light absorption coefficient of the jacket shall be at least 400 when measured at a wave length of 375 nanometers as per ASTM D 3349.

11 SHIPPING

- A. The fiber optic cable shall be shipped on a strongly constructed reel. The reel shall be designed to prevent damage to the fiber optic cable during shipment and installation.
- B. All fiber optic cable ends shall be sealed to prevent the escape of the filling compound and the entry of moisture.
- C. Both fiber optic cable ends shall be equipped with flexible pulling eyes.
- D. A thermal protective wrap shall be applied over the outer turns of the cable on each reel.

12 TESTING

- A. Testing shall include the tests on elements of the passive fiber optic components at the factory. The factory test shall include verification of the fiber specifications as listed in the Fiber Characteristics Table which shall be supplied by the manufacturer with the appropriate documentation. After the cable has been placed on the shipping reel and before shipping, 100 percent of all fibers shall be tested for attenuation. Any cable that has been in storage shall be tested or retested before shipping. Copies of the results shall be maintained on file with a file identification number for a minimum of 10 years, attached to the cable reel in a waterproof pouch, and submitted to the Engineer prior to the delivery of the cable to the job site.
- B. Provide all personnel, equipment, instrumentation and materials necessary to perform all testing at the factory, and at deployment sites.
- C. Documentation of all test results shall be provided to the Engineer two working days before the material is scheduled to arrive on site.
- D. Refer to specification EB-FO-SPLC-5 for other testing requirements.
- E. Do not install the cable until all of the tests have been completed and with written approval by the Engineer.
- F. Replace all unsatisfactory reels of cable which do not pass the tests with new reels of cable at no additional cost to the Department. The new reels of cable shall then be tested to demonstrate acceptability. Copies of the test results shall be submitted to the Engineer.

13 TRAINING

A. Refer to specification EB-FO-SPLC-5 for training requirements.

14 INSTRUCTIONS AND GUARANTEES

- A. Supply ten sets of maintenance and repair manuals with furnished cables.
- B. No changes or substitutions in these requirements will be acceptable unless authorized in writing. Inquiries regarding this specification shall be addressed to the Manager, Office of ITS Engineering, New Jersey Department of Transportation, P.O. Box 613, 1035 Parkway Avenue, Trenton, New Jersey 08625.
- C. Upon request by the Department, provide and deliver a sample of the cable, approximately 2 feet in length, to the Office of ITS Engineering. Work performed on the sample shall meet all relevant requirements stated in this specification. The sample shall not be returned.
- D. Provide a two-year warranty for all installed and supplied cables, with warranty period starting on the date that the installation is formally accepted by the Department. Thoroughly inspect the cables prior to installation. The Contractor shall be fully responsible for the installation of defect-free products and for the replacement of any product found to be defective within the warranty period.

918.39 FIBER OPTIC CABLE - SINGLE MODE, LOOSE TUBE, TERMINATION

The purpose of these specifications is to describe minimum acceptable design requirements for this equipment.

1 GENERAL

- A. The Fiber Optic Cable described in this specification shall be all dielectric, single jacketed, gel filled, with single loose tubes optimally protected from water infiltration, and contain single mode, dual-window (1300 nanometers and 1550 nanometers) fibers and shall conform to these special provisions.
- B. Each length of termination cable shall have factory installed breakout kit for pullout protection of fibers including furcation tubing and ST connectors installed on one end of the cable for connection to patch panels.
- C. The construction and testing of the fiber optic cable shall meet or exceed all applicable Electronic Industry Standards (EIA/TIA), International Telegraph and Telephone Consultative Committee (CCITT), ANSI, BELLCORE, ASTM standards and FDDI specifications.
- D. Incidental to the fiber optic cable termination item is all necessary splicing to connect the ITS device/signal controller to the fiber optic trunk cable. This includes splicing the fiber optic termination cable to the connectorized pigtails and the trunk cable.

2 TRUNK CABLE

- A. The fiber optic cable shall have 8 fibers, be all dielectric and have a single jacket with a maximum cable diameter of 0.5 inch.
- B. The optical fibers shall be contained within a loose, gel filled buffer tube. A high or medium density polyethylene outer jacket shall be provided for overall protection.
- C. The fiber optic cable shall include the following components:
 - 1) 8 color coded, single mode, optical fibers
 - 2) Single tube, gel filled, color coded
 - 3) Filler rods as required
 - 4) Core and cable gel flooding
 - 5) Core separator or binders
 - 6) Tensile outer strength member
 - 7) Ripcord
 - 8) HDPE or MDPE outer jacket, co-extruded colored stripe coded and labeled
- D. The cable shall be manufacturer rated for 600 pounds maximum tensile loading during installation (also called loaded).
- E. The cable shall be manufacturer rated for 130 pounds maximum tensile loading for the unloaded application (also known as in-service, or long term application).
- F. The cable shall be designed for a minimum bending radius of 20 times the cable diameter during installation.
- G. The cable shall be designed for a minimum bending radius of 10 times the cable diameter for unloaded application.

- H. The cables shall be tested in accordance with FOTP-33, "Fiber Optic Cable Tensile Loading and Bending Test." Using a maximum mandrel and sheave diameter of 560 millimeters, the cable shall withstand a tensile load of 608 pounds applied for one hour (using "Test Condition II" of the test plan) without exhibiting and average increase in attenuation greater than 0.10 decibels. The cable shall not experience a measurable increase in attenuation when subjected to the rated residual tensile load, 135 pounds.
- I. The cables shall be tested in accordance with FOTP-41, "Compressive Loading Resistance of Fiber Optic Cables". Non-armored cables shall withstand a minimum compressive load of 125 pounds/inch applied uniformly over the length of the sample. The average increase in attenuation for the fibers shall not be greater than 0.10 decibels cables subjected to this compressive load, and the sample shall not exhibit any measurable increase in attenuation after load removal.
- J. The cables shall be tested in accordance with FOTP-25, "Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies." The cables shall withstand 25 impact cycles without exhibiting an average increase in attenuation greater than 0.20 decibels. The cable jacket shall not exhibit evidence of cracking or splitting at the completion of the test.
- K. The cables shall be tested in accordance with FOTP-104, "Fiber Optic Cable Cyclic Flexing Test". The cable shall withstand 25 cycles of mechanical flexing around a mandrel not greater than 20 times the cable diameter at a rate of 30 ± 1 cycles/minutes without experiencing an average increase in attenuation greater than 0.10 decibels at 1550 nanometers. No outer cable jacket cracking or splitting shall be observed under 10X magnification.
- L. The cables shall be tested in accordance with FOTP-85, 'Fiber Optic Cable Twist Test". A length of cable no greater than 4 meters in length shall withstand 10 cycles of mechanical twisting without exhibiting an average increase in attenuation greater than 0.10 decibels. The cable jacket shall exhibit no cracking or splitting when observed under 10X magnification after completion of the test.
- M. The cable shall have a minimum proof test stress of 100 kpsi (conforming to EIA-455-31A).
- N. Fluid penetration testing shall be conducted in accordance with FOTP-82, "Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable." When one meter static head or equivalent continuous pressure is applied at one end of a one meter length of filled cable for one hour, no water shall leak through the open cable end.
- O. The cables shall be tested for compound flow or drip testing in accordance with FOTP-81, "Compound Flow (Drip) Test for Filled Fiber Optic Cable." The filling and flooding compounds shall not flow (drip or leak) from the filled fiber optic cable when tested for 24 hours at 149 °F.

3 FIBER CHARACTERISTICS

- A. Each optical fiber shall be glass and consist of a doped silica core surrounded by concentric silica cladding. All fibers in the buffer tube shall be usable fibers which meet attenuation requirements and shall be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical, and environmental requirements of these specifications.
- B. The coating shall be a dual layered, UV cured acrylate. The coating shall be mechanically or chemically stripable without damaging the fiber.
- C. The cable shall comply with the optical and mechanical requirements over an operating temperature range of 40 to +158 degrees Fahrenheit.
- D. The required fiber grade shall reflect the maximum individual fiber attenuation, to guarantee the required performance of each and every fiber in the cable. For all fibers, the attenuation specification shall be a maximum attenuation for each fiber over the entire operating temperature range of the cable.
- E. Single mode fibers within the finished cable shall meet the following requirements:
 - 1) Parameters Single Mode Fiber
 - 2) Type Step Index
 - 3) Core diameter 8.3 µm (nominal)
 - 4) Cladding diameter 124 μ m \pm 2.0 μ m
 - 5) Core to Cladding Offset 1.0 μm
 - 6) Coating Diameter 250 μ m ± 15 μ m
 - 7) Cladding Non-circularity 2.0%
 - 8) Proof/Tensile Test 100 kpsi, min.
 - 9) Attenuation:
 - i.@ 1310 nm < 0.4 dB/km

- ii. @ 1550 nm < 0.4 dB/km
- 10) Attenuation at the Water Peak < 2 dB/km @ $1300 \pm 3 \text{ nm}$
- 11) Chromatic Dispersion:
 - i.Zero Dispersion Wavelength 1301.5 to 1321.5 nm
 - ii.Zero Dispersion Slope 0.092 ps/(nm2•km)
 - iii. Maximum Dispersion: 3.3 ps/(nm•km for 1285 1330 nm, <18 ps/(nm•km) for 1550 nm
- 12) Cut-Off Wavelength <1 250 nm
- 13) Mode Field Diameter $9.3 \pm 0.5 \,\mu m$ at 1300 nm
- 14) Macrobending Loss measured at 1550 nm on loose fiber of 100 turns of 75 mm diameter (tested in accordance with EIA-455-62), shall be less than or equal to:

i.0.1 dB @ 1310 nm ii.0.5 dB @ 1550 nm

4 COLOR CODING AND LABELING

- A. Each optical fiber shall be distinguishable from others in the buffer tube by means of color coding according to the following:
 - 1) fiber 1: Blue
 - 2) fiber 2: Orange
 - 3) fiber 3: Green
 - 4) fiber 4: Brown
 - 5) fiber 5: Slate
 - 6) fiber 6: White
 - 7) fiber 7: Red
 - 8) fiber 8: Black
- B. Cables shall be distinguishable from each other by co-extruded color stripe coding and labeling, and shall be according to the plans and special specifications. The entire outer jacket of the cable shall be colored by industry standard coloring additive to the jacket material, not by an external applied coloring. The labeling shall be printed on the cable every meter. The label shall be in capital letters and the height of the lettering shall be approximately 2.5 millimeters. The marking shall be in a contrasting color to the cable jacket. The colors for the outer jacket shall be one of the following colors as designated in the contract documents:
 - 1) Blue
 - 2) Orange
 - 3) Green
 - 4) White
 - 5) Red
 - 6) Black

The cable color and label used for each specific cable shall be as designated on the contract documents.

- C. The colors shall be targeted in accordance with the Munsell color shades and shall meet EIA/TIA-598 "Color Coding of Fiber Optic Cables".
- D. The color formulation shall be compatible with the fiber coating and the buffer tube filling compound, and be heat stable. The colors shall not fade or smear or be susceptible to migration and it shall not affect the transmission characteristics of the optical fibers and shall not cause fibers to stick together.

5 BUFFER TUBES

- A. Clearance shall be provided in the loose buffer tube between the fibers and the inside of the tube to allow for expansion without constraining the fiber. The fibers shall be loose or suspended within the tube. The fibers shall not adhere to the inside of the buffer tube.
- B. Termination cables shall have 8 fibers in a single tube. Diameter of buffer tube shall be a maximum of 4.5 millimeters.
- C. The loose buffer tube shall be extruded from a material having a coefficient of friction sufficiently low to allow free movement of the fibers. Buffer tube shall be made of a tough abrasion resistant material to provide

- mechanical and environmental protection of the fibers, yet designed to permit safe intentional "scoring" and breakout, without damaging or degrading the internal fibers.
- D. Buffer tube filling compound shall be a homogenous hydrocarbon-based gel with anti-oxidant additives and used to prevent water intrusion and migration. The filling compound shall be non-toxic and dermatologically safe to exposed skin. The compound shall be chemically and mechanically compatible with all cable components, non-nutritive to fungus, non-hygroscopic and electrically non-conductive. The filling compound shall be free from dirt and foreign matter and shall be readily removable with conventional nontoxic solvents.

6 CORE AND CABLE FLOODING

- A. The cable core interstices shall be filled with a polyolefin based compound or equivalent to prevent water ingress and migration.
- B. The flooding compound shall be homogeneous, non-hygroscopic, electrically non-conductive, and non-nutritive to fungus. The compound shall also be nontoxic, dermatologically safe and compatible with all other cable components.

7 TENSILE STRENGTH MEMBER

- A. Tensile strength shall be provided by high tensile strength aramid yarns and fiberglass, which shall be helically stranded evenly around the cable core.
- B. The cable shall contain one ripcord under the jacket to provide for easy sheath removal.

8 OUTER JACKET

- A. The jacket shall be free of holes, splits, and blisters and shall be high density cross-linked or medium density polyethylene with minimum nominal jacket thickness of 40 +/- mils.
- B. Jacketing material shall be applied directly over the tensile strength members and flooding compound and shall not adhere to the aramid strength material.
- C. The outer jacket material shall be color coded and labeled according to the color code in Section IV.
- D. The jacket material shall contain a suitable antioxidant, and shall not promote the growth of fungus.
- E. The jacket shall be marked with the manufacturer's name, the words "Fiber Optic Cable", date of manufacture, and sequential measurement markings every meter. This is in addition to the labeling in Section IV, Subsection 4-3. The actual length of the cable shall be within ± 1 percent of the length marking. The marking shall be in a contrasting color to the cable jacket. The height of the marking shall be approximately 2.5 millimeters.
- F. High or medium density polyethylene shall be in accordance with ASTM D 1248, Type II or III, class C, category 4 or 5 and shall contain a suitable antioxidant system. The light absorption coefficient of the jacket shall be at least 400 when measured at a wave length of 375 nanometers as per ASTM D 3349.

9 SHIPPING

- A. The fiber optic cable shall be shipped on a strongly constructed reel. The reel shall be designed to prevent damage to the fiber optic cable during shipment and installation.
- B. All fiber optic cable ends shall be sealed to prevent the escape of the filling compound and the entry of moisture.
- C. Both fiber optic cable ends shall be equipped with flexible pulling eyes.
- D. A thermal protective wrap shall be applied over the outer turns of the cable on each reel.

10 TESTING

- A. Testing shall include the tests on elements of the passive fiber optic components at the factory. The factory test shall include verification of the fiber specifications as listed in the Fiber Characteristics Table which shall be supplied by the manufacturer with the appropriate documentation. After the cable has been placed on the shipping reel and before shipping, 100 percent of all fibers shall be tested for attenuation. Any cable that has been in storage shall be tested or retested before shipping. Copies of the results shall be maintained on file with a file identification number for a minimum of 10 years, attached to the cable reel in a waterproof pouch, and submitted to the Engineer prior to the delivery of the cable to the job site.
- B. Provide all personnel, equipment, instrumentation and materials necessary to perform all testing at the factory, and at deployment sites.

- C. Documentation of all test results shall be provided to the Engineer two working days before the material is scheduled to arrive on site.
- D. Refer to specification EB-FO-SPLC-5 for other testing requirements.
- E. Do not install the cable until all of the tests have been completed and with written approval by the Engineer.
- F. Replace all unsatisfactory reels of cable which do not pass the tests with new reels of cable at no additional cost to the Department. The new reels of cable shall then be tested to demonstrate acceptability. Copies of the test results shall be submitted to the Engineer.

11 TRAINING

A. Refer to specification EB-FO-SPLC-5 for training requirements.

12 INSTRUCTIONS AND GUARANTEES

- A. Provide ten sets of maintenance and repair manuals with the furnished cables.
- B. No changes or substitutions in these requirements will be acceptable unless authorized in writing. Inquiries regarding this specification shall be addressed to the Manager, Office of ITS Engineering, New Jersey Department of Transportation, P.O. Box 613, 1035 Parkway Avenue, Trenton, New Jersey 08625.
- C. The Supplier agrees upon the request of the Manager, Office of ITS Engineering to deliver to the Office, a sample of the cable, approximately 2 feet in length, to be supplied in compliance with these specifications for inspection and test before acceptance. The sample shall not be returned.
- D. The supplied cable shall carry a two-year warranty, from the date of project acceptance by the State, to be free of defects. The installer shall fully test the cable prior to installation and within the warranty period. The installer shall be fully responsible for the installation of defect free cable and for the replacement of any cable found to be defective due to improper construction or improper installation for two years after the State's acceptance of the project.
- E. The supplied cable must be a standard product of the manufacturer of which not fewer than 20 miles is in existing operation in an underground conduit environment for a minimum of one year, and is found satisfactory by the end users. The Department may contact the existing cable users for reference; provide the contact information of the Chief Engineer of at least two existing cable end users with the shop drawing submittal. For this reference the existing cable user must be a State-level government agency or a public utility (i.e., Telephone, Cable TV, or Transportation) in North America, and has at least 10 miles of the same product installed and in current use.

918.40 FIBER OPTIC CABLE CONNECTORS TYPE ST

The purpose of these specifications is to describe minimum acceptable design requirements for Fiber Optic Cable Connectors type ST, factory installed on fiber optic termination cable (also called break-out or distribution cable) or field installed on trunk cable.

1 GENERAL

- A. Where termination of a fiber on a trunk cable is required as shown on the contract plans, terminate the fiber, using a fusion splicer, with a fiber optic pigtail which is pre-connectorized with a type ST-type fiber optic connector. The connectorized pigtail shall be factory installed.
- B. Comply with all applicable Electronic Industry Standards (EIA/TIA), International Telegraph and Telephone Consultative Committee (CCITT), ANSI, ASTM standards and FDDI specifications for the termination and testing of the fiber optic connectors, and attached cables.

2 CONNECTOR CHARACTERISTICS

- A. Use only factory installed pre-connectorized fiber optic pigtails. For the pigtail, use fiber optic strand of the same type, core and cladding diameters matching those of the connected fiber optic trunk cable.
- B. .Use only ST-type fiber optic connectors equipped with pre-radiused Zirconia ceramic ferrule.
- C. Provide product with designed operating temperature range between -40 to +176 degrees Fahrenheit.
- D. Provide connectorized pigtail with connector insertion loss of maximum 0.35 dB each.
- E. Provide connectorized pigtail with signal return reflection of minimum 40 dB each.

- F. Provide connectorized pigtail with a worst case durability change (increase in connector insertion loss) of maximum 0.2 dB per 500 mating cycles.
- G. Provide connectorized pigtail with a minimum pull out strength of 50 pounds.

3 COLOR CODING AND LABELING

A. Provide single mode connectors with a yellow collar on the body and/or boot.

4 SHIPPING

- A. Ship the fiber optic cable on a strongly constructed reel or in a flat crush proof container depending on the specific lengths of the shipped cable. Design the reel or flat container to prevent damage to the fiber optic cable and connectors during shipment and installation.
- B. Seal the ends of all fiber optic cable to prevent ingress of moister and the escape of the filling compound.
- C. Equip the end of the fiber optic cable with flexible pulling eyes.
- D. Apply a thermal protective sheet over the outer turns of the cable on each reel, or wrap the thermal protective sheet around the cable in the flat container.

5 TESTING

- A. Submit factory certified test report on the pre-connectorized pigtail. Include as minimum signal attenuation and return reflection of the pre-connectorized pigtail in the factory tests.
- B. Submit signal power budget calculations on terminated fibers used in the optical signal circuits established in this project as per specification EB-FOC-SPC-5, for approval by the Department.
- C. Perform Optical line loss (OLS) test and Bi-directional optical time-domain reflectometer (OTDR) tests on the terminated fibers, and submit related test documents as per specification EB-FOC-SPC-5.

6 INSTRUCTIONS AND GUARANTEES

- A. Supply one set of complete installation and use manuals, assembly plans and instructions.
- B. No changes or substitutions in these requirements will be acceptable unless authorized in writing. Inquiries regarding this specification shall be addressed to the Manager, Office of ITS Engineering, New Jersey Department of Transportation, P.O. Box 613, 1035 Parkway Avenue, Trenton, New Jersey 08625.
- C. Upon request by the Department, provide and deliver a sample of the cable, approximately 2 feet in length, with ST terminators on one end to the Office of ITS Engineering. Work performed on the sample shall meet all relevant requirements stated in this specification. The sample shall be returned when related shop drawings are approved.
- D. Provide a two-year warranty for all installed products, with warranty period starting on the date that the installation is formally accepted by the Department. Thoroughly inspect the units prior to installation. The Contractor shall be fully responsible for the installation of defect-free products and for the replacement of any product found to be defective within the warranty period.

918.41 COMMUNICATION HUB MODIFICATIONS

The purpose of these specifications is to describe minimum acceptable requirements for this work.

1 GENERAL - I

- A. Modify the communications hub and related network switches in the existing hub enclosure located at the intersection between SR-287 and US-1, to allow and route IP communication between the video server at the control center, and the new CCTV cameras at SR-18.
- B. Likewise, modify, if applicable, the communications hub and related network switches in the other existing hub enclosures of the NJDOT Statewide fiber-optic backbone system to allow and route IP communication between the video server at the control center, and the new CCTV cameras at SR-18.

918.42 ITS MODIFICATIONS TO TOC

Specifications for modifications to the configurations of the communications hub, related network switches, video server(s), and video workstations at the control center.

The purpose of these specifications is to describe minimum acceptable requirements for this work.

1 GENERAL - I

- A. Modify the communications hub, related network switches, and related network connections to the video server (video management system server), all located in the control center, to allow and route IP communication between the server and the new CCTV cameras at SR-18.
- B. Modify the configuration of the video server (video management system server) to integrate new CCTV cameras into the existing video system.
- C. Modify the video software at the workstations (computers) to add the new CCTV cameras to the existing video system. Ensure that the video images from the new cameras can be viewed on the workstations, and ensure that the PTZ controls of the new cameras can be affected using the PTC control tools present in the existing video system.

SECTION 919 – MISCELLANEOUS

THE FOLLOWING IS ADDED:

919.15 POLYESTER MATTING

Provide polyester matting of commercial quality that is a composite of polyester base fiber and vinyl chloride resin and is permeable to air and water, but shall prevent sunlight from reaching the soil. Ensure that the matting resists ultraviolet light, mildew and algae. Ensure that the matting is self-extinguishing when removed from flame. Ensure that the matting has a minimum thickness of 1/4 inch.

THE FOLLOWING IS ADDED:

919.16 MEMBRANE WATERPROOFING

Provide Membrane Waterproofing on Structure No. 1237-170 – Route 18 (Hoes Lane) over Ambrose Brook to the surfaces indicated on the Contract Drawings. Membrane waterproofing shall be a HMA material reinforced with synthetic fabric capable of withstanding puncture and severe stress. Membrane shall be cold applied and capable of providing a good bond to both the surface and to itself on overlap areas.

Membrane waterproofing shall conform to the following:

Physical Properties	Test Method	Requirement
Thickness		60 ± mils minimum
Tensile Strength of Reinforcement Only	ASTM D 882-A	50 lbs/in width minimum
Elongation of Compound Only	ASTM D 882-A	300% Minimum
Water Absorption	ASTM D 517	1% maximum by weight
Permeance	ASTM E 96-B	0.05 perms maximum
Pliability	ASTM D 146	No cracks at 180-degree
		(-25 °F, 1" mandrel) bend
Puncture Resistance	ASTM E 154	40 lbs minimum
Compound Softening Point	ASTM D 36	220 °F
Peel Adhesion	ASTM D 903	4 lbs/in minimum

Cost of membrane waterproofing is incidental to the standard item 'Concrete Bridge Deck, HPC'.

DIVISION 1000 – EQUIPMENT

SECTION 1001 – TRAFFIC CONTROL EQUIPMENT

THE FOLLOWING SUBSECTION IS ADDED:

1001.04 PORTABLE TRAILER MOUNTED CCTV CAMERA ASSEMBLY

Provide a Portable Trailer Mounted CCTV Camera Assembly (PTMCCA) with the following:

A. Trailer Platform

- 1. Maximum size, including tongue, 14 feet long by 7 feet wide by 8 feet high.
- 2. NJDOT approved lighting package to include electrical brake and marker lights with wire connections.
- 3. Primed and painted with powder coated orange color.
- 4. Fitted with manual telescoping outriggers with adjustable jacks sized to counter full mast extension.
- 5. Four 3500 pounds, drop leg, top wind screw jacks.
- 6. All equipment secured to prevent theft or separation from platform.
- 7. 24/7 operation in all weather conditions.
- 8. One locking NEMA-4 equipment box for operational controls.
- 9. Removable wheels (with wheel locks) when trailer is in deployed position.
- 10. Operation manual with a copy placed in the storage bin.

B. Mast

- 1. 150 pounds payload capacity.
- 2. 29 feet to 32 feet of extension with capability to mount antenna at 20 feet, 25 feet or at the top, 10 feet maximum nested length of mast 3 to 9 sections.
- 3. Un –guyed.
- 4. Driven by galvanized steel cable.
- 5. Spiral conduit for cables.
- 6. Compactly retractable when nested into storage container at the bottom & foldable for easy transport.
- 7. Operated by a power winch with a safety brake.
- 8. Capable of being raised or lowered during sustained wind speeds of 30 miles per hour.

C. Power Source

Equip the PTMCCA with either a diesel charged or a solar charged battery system. Ensure that the PTMCCA is also capable of operating on 120-volt AC electrical service. The Department may require a solar charged battery system in noise sensitive areas. Provide the power with a battery back up system capable of providing continuous operation when the primary power source fails. Ensure that the power source meets the following requirements:

1. Diesel. Ensure that the fuel tank is capable of operating the sign for a period of 72 hours without refueling. Equip with an exhaust muffler and a United States Department of Forestry approved spark arrester. Ensure that the engine is shock mounted to reduce vibration and locked in a ventilated enclosure.

2. Solar. Provide solar panels capable of recharging the batteries at a rate of 4 hours of sun for 24 hours of camera usage. Ensure that the battery capacity is capable of operating the sign for a period of 18 days without sunlight.

D. Electronics

- 1. Cellular (CDMA), microwave, or 802.11 bandwidth option.
- 2. Work lights in all cabinets.
- 3. Remote trailer diagnostics (battery level, charging output, etc.).

E. Camera and Software

Ensure that the camera has the following characteristics:

- 1. Dome Camera in a heavy duty plastic dome or with a weather resistant case.
- 2. Impact resistant viewing window.
- 3. Minimum resolution of NTSC 704 (H) x 480 (V).
- 4. Backlight compensation.
- 5. Image stabilization.
- 6. Light Sensitivity 0.02 lux NIR Mode.
- 7. Auto Focus with Manual Focus capability.
- 8. Auto White Balance with Manual White Balance capability.
- 9. Motorized Zoom up to 16x optical, 10x digital.
- 10. Motorized Pan-Tilt, pan 360°, tilt 180°.
- 11. Thermostatically controlled heater and defroster -50° to 140°F operating range.
- 12. Windshield wiper.
- 13. 24/7 operation in all weather conditions.
- 14. Time and date stamp.

Ensure the software provides the following functionality:

- 1. Remote control of pan, tilt and zoom.
- 2. Display of streaming video in MPEG format, motion-JPEG, and single snapshot JPEG images, remotely interchangeable by using central software.
- Preset controls of pan/tilt/zoom combinations. Ensure all presets are accessible from a drop-down menu with descriptive name of preset. Set first 8 presets with quick- launch icons with graphical representation of the preset views.
- 4. Display of all the project's web cams in a single view screen.
- 5. Display of local time and weather conditions including temperature and humidity.
- 6. Saving images and sending e-mail images.
- Viewing archived images via a graphical calendar control and storing archived images at least every five minutes.
- 8. Three levels of password protection: administrator, user, and guest, individual user accounts.
- 9. Monitoring and controlling the cameras using web access.

SECTION 1009 – HMA PLANT EQUIPMENT

1009.01 HMA PLANT

A. Requirements for HMA Mixing Plants.

THE FOLLOWING IS ADDED AFTER THE SECOND PARAGRAGH:

The HMA producer is required to have a quality control (QC) program plan approved annually by the ME as per Materials Approval Procedure MAP-102. The HMA producer is required to ensure that the QC plan conforms to the requirements outlined in the report entitled "Hot Mix Asphalt Quality Control Program Plan" prepared by the Department of Transportation and New Jersey Asphalt Paving Association. Failure to follow these requirements will result in rejection of HMA materials supplied by the HMA producer and removal of the HMA supplier from the QPL.

THE FOLLOWING SUBSECTION IS ADDED AFTER 1009.02:

1009.03 ASPHALT-RUBBER BINDER BLENDING EQUIPMENT

Provide equipment for preparation of Asphalt-Rubber Binder. Ensure that the unit is equipped with a crumb rubber feed system capable of continuously supplying the asphalt cement feed system, and is capable of fully blending the individual crumb rubber particles with the asphalt cement. Use an asphalt-rubber binder storage tank that is equipped with a heating system capable of maintaining the temperature of the binder between 325 and 375 °F during the reaction. Ensure the asphalt-rubber binder storage tank is also equipped with an internal auger mixing device, oriented horizontally in the tank, capable of maintaining a uniform mixture of the asphalt-rubber binder.

Ensure that the tanks for storage of asphalt-rubber binder are equipped to uniformly heat the material to the required temperature under effective and positive control at all times. Ensure that heating is accomplished so that no flame comes in contact with the heating tank.

Provide a circulating system of sufficient capacity for the binder to ensure continuous circulation between the storage tank and proportioning units during the entire operating period. Ensure that the discharge end of the binder circulating pipe is maintained below the surface of the binder in the storage tank to prevent discharge of hot binder into the open air.

Ensure that pipe lines and fittings are steam or oil jacketed, electrically or otherwise heated, and insulated to prevent heat loss.

Provide valves according to AASHTO T 40, except ensure that a sampling valve is also located in the lowest third of each storage tank.

If the plant has been equipped with a water injection type asphalt foaming system, ensure that the system will allow the proper amount of asphalt rubber binder to be supplied continuously or provide a by-pass to ensure that the proper amount of asphalt rubber binder is supplied to the mix.

SECTION 1011 - PRECAST AND PRESTRESSED CONCRETE PLANT EQUIPMENT

1011.03 ME'S OFFICE

THE SECOND PARAGRAPH SUBPART 2 &3 ARE CHANGED TO:

- 2. One high-speed broad band connection with a minimum speed of 3 megabits per second (mbps) with dynamic IP address (DSL, Cable, etc.).
- 3. Two desks and 2 chairs.

NJDOT TEST METHODS

NJDOT B-8 – DETERMINING JOB MIX FORMULA FOR MODIFIED OPEN-GRADED FRICTION COURSE MIXES

C. Procedure.

3. Relative VMA Asphalt Content.

THE FOURTH SENTENCE IN THE FIRST PARAGRAPH IS CHANGED TO:

Determine the bulk specific gravity, Gmb from each specimen according to NJDOT B-6 or AASHTO T 331.

THE FOOTNOTE FOR GMB IN THE SECOND EQUATION IS CHANGED TO:

Gmb = the bulk specific gravity of the specimen as determined by NJDOT B-6 or AASHTO T 331.

THE FOLLOWING TEST METHODS ARE ADDED:

NJDOT B-10 - OVERLAY TEST FOR DETERMINING CRACK RESISTANCE OF HMA

- **A. Scope.** This test method is used to determine the susceptibility of HMA specimens to fatigue or reflective cracking. This test method measures the number of cycles to failure.
- **B.** Apparatus. Use the following apparatus:
 - 1. Overlay Tester. An electro-hydraulic system that applies repeated direct tension loads to specimens. The machine features two blocks, one is fixed and the other slides horizontally. The device automatically measures and records a time history of load versus displacement every 0.1 sec at a selected test temperature.
 - The sliding block applies tension in a cyclic triangular waveform to a constant maximum displacement of 0.06 cm (0.025 in.). This sliding block reaches the maximum displacement and then returns to its initial position in 10 sec. (one cycle).
 - 2. Temperature Control System. The temperature chamber must be capable of controlling the test temperature with a range of 32 to 95 $^{\circ}$ F (0 to 35 $^{\circ}$ C).
 - 3. Measurement System. Fully automated data acquisition and test control system. Load, displacement, and temperature are simultaneously recorded every 0.1 sec.
 - 4. Linear Variable Differential Transducer (LVDT). Used to measure the horizontal displacement of the specimen (+/- 0.25 in.). Refer to manufacturer for equipment accuracy for LVDT.
 - 5. Electronic Load Cell. Used to measure the load resulting from the displacement (5000 lb capacity). Refer to manufacturer for equipment accuracy for load cell.
 - 6. Specimen Mounting System. Used two stainless steel base plates to restrict shifting of the specimen during testing. The mounting jig holds the two stainless steel base plates for specimen preparation.
 - 7. Cutting Template.
 - 8. Two Part Epoxy. Two part epoxy with a minimum 24 hour tensile strength of 600 psi (4.1 MPa) and 24 hour shear strength of 2,000 psi (13.8 MPa).
 - 9. 10 lb weight (4.5 kg). Used to place on top of specimens while being glued to specimen platens.
 - 10. ¼ inch Width Adhesive Tape. Placed over gap in plates to prevent the epoxy from bonding the plates together.
 - 11. Paint or Permanent Marker. Used to outline specimens on platens for placement of epoxy.
 - 12. 3/8-in. Socket Drive Handle with a 3-in. (7.6 cm) extension.
- **C. Procedure.** Perform the following steps:
 - 1. Sample Preparation.

- **a. Laboratory Molded Specimens -** Use cylindrical specimens that have been compacted using the gyratory compactor (AASHTO T 312). Specimen diameter must be 6 inches (150 mm) and a specimen height must be 4.5 inches +/- 0.2 inches (115 +/- 5 mm).
 - Note 1 Experience has shown that molded laboratory specimens of a known density usually result in a greater density (or lower air voids) after being trimmed. Therefore, it is recommended that the laboratory technician produce molded specimens with an air void level slightly higher than the targeted trimmed specimen. Determine the density of the final trimmed specimen in accordance with AASHTO T 166.
- **b.** Core Specimens Specimen diameter must be 6 inches +/- 0.1 inch (150 mm +/- 2 mm). Determine the density of the final trimmed specimen in accordance with AASHTO T166.
- 2. Trimming of Cylindrical Specimen. Before starting, refer to the sawing device manufacturer's instructions for cutting specimens.
 - a. Place the cutting template on the top surface of the laboratory molded specimen or roadway core. Trace the location of the first two cuts by drawing lines using paint or a permanent maker along the sides of the cutting template.
 - b. Trim the specimen ends by cutting the specimen perpendicular to the top surface following the traced lines. Discard specimen ends.
 - c. Trim off the top and bottom of the specimen to produce a sample with a height of (1.5 inches +/- 0.02 inches (38 mm +/- 0.5 mm).
 - d. Measure the density of the trimmed specimen in accordance with AASHTO T 166. If the specimen does not meet the density requirement as specified for performance testing for the mix being tested, then discard it and prepare a new specimen.
 - e. Air dry the trimmed specimen to constant mass, where constant mass is defined as the weight of the trimmed specimen not changing by more than 0.05% in a 2 hour interval.

3. Mounting Trimmed Specimen to Base Plates (Platens).

- a. Mount and secure the base plates (platens) to the mounting jig. Cut a piece of adhesive tape approximately 4.0 inches (102 mm) in length. Center and place the piece of tape over the gap between the base plates.
- b. Prepare the epoxy following manufacturer's instructions.
- c. Cover a majority of the base plates (platens) with epoxy, including the tape. Glue the trimmed specimen to the base plates.
- d. Place a 10 lb (4.5 kg) weight on top of the glued specimen to ensure full contact of the trimmed specimen to the base plates. Allow the epoxy to cure for the time recommended by the manufacturer. Remove the weight from the specimen after the epoxy has cured.
- e. Turn over the glued specimen so the bottom of the base plates faces upward. Using a hacksaw, cut a notch through the epoxy which can be seen through the gap in the base plates. The notch should be cut as evenly as possible and should just begin to reach the specimen underneath the epoxy. Great care should be taken not to cut more than 1/16 inch (1.58 mm) into the specimen.
- f. Place the test sample assembly in the Overlay Tester's environmental chamber for a minimum of 1 hour before testing.
- 4. Start Testing Device. Please refer to manufacturer's equipment manual prior to operating equipment.
 - a. Turn on the Overlay Tester. Turn on the computer and wait to ensure communication between the computer and the Overlay Tester occurs.
 - b. Turn on the hydraulic pump using the Overlay Tester's software. Allow the pump to warm up for a minimum of 20 minutes.

- c. Turn the machine to load control mode to mount the sample assembly.
- 5. Mounting Specimen Assembly to Testing Device. Enter the required test information into the Overlay Tester software for the specimen to be tested.
 - a. Mount the specimen assembly onto the machine according to the manufacturer's instructions and the following procedural steps.
 - 1. Clean the bottom of the base plates and the top of the testing machine blocks before placing the specimen assembly into the blocks. If all four surfaces are not clean, damage may occur to the machine, the specimen, or the base plates when tightening the base plates.
 - 2. Apply 15 lb-in of torque for each screw when fastening the base plates to the machine.

6. Testing Specimen.

- a. Perform testing at a constant temperature recommended by the New Jersey Department of Transportation for the mixture in question. This is typically either 59 °F (15 °C) or 77 °F (25 °C).
 - Note 3 Ensure the trimmed specimen has also reached the constant temperature required.
- b. Start the test by enabling the start button on the computer control program. Perform testing until a 93% reduction or more of the maximum load measured from the first opening cycle occurs. If 93% is not reached, run the test until a minimum of 1,200 cycles.
- c. After the test is complete, remove the specimen assembly from the Overlay Tester machine blocks.
- **D. Report.** Include the following items in the report:
 - 1. Date and time molded or cored.
 - 2. NJDOT mixture identification.
 - 3. Trimmed specimen density.
 - 4. Starting Load.
 - 5. Final Load.
 - 6. Percent decline (or reduction) in Load.
 - 7. Number of cycles until failure.
 - 8. Test Temperature

NJDOT B-11- DETERMINING GRADATION OF CRUMB RUBBER FOR ASPHALT MODIFICATION

- A. Scope. This method is used to determine the gradation of the crumb rubber for asphalt-rubber binder
- **B.** Apparatus. Use the following apparatus:
 - 1. Oven capable of maintaining a temperatures of 140 ± 10 °F for drying sample to a constant weight.
 - 2. Rubber balls having a weight of 8.5 ± 0.5 grams, a diameter of 24.5 ± 0.5 mm mm, and a Shore Durometer "A" hardness of 50 ± 5 per ASTM Designation D 224
 - 3. No. 8, 16, 30, 50, 100, and 200 sieves conforming to AASHTO M 92.
 - 4. Mechanical sieve shaker conforming to AASHTO T 27.
 - 5. Balance conforming to AASHTO M 231 and having a minimum capacity of 100 grams with a precision of 0.1 gram.
- **C. Procedure.** The crumb rubber for asphalt rubber binder is required to conform to the gradations specified below when tested in accordance with ASTM Designation C 136 except as follows:
 - 1. Obtain 100 ± 5 grams from the crumb rubber sample and dry to a constant weight at a temperature of not less than 135 °F nor more than 145 °F and record the dry sample weight.
 - 2. Place the crumb rubber sample and 5.0 grams of talc in a one pint jar, then shake it by hand for a minimum of one minute to mix the crumb rubber and the talc. Continue shaking or open the jar and stir until the particle agglomerates and clumps are broken and the talc is uniformly mixed.

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- 3. Place one rubber ball on each sieve. After sieving the combined material for 10 ± 1 minutes, disassemble the sieves. Brush remaining material adhering to the bottom of a sieve into the next finer sieve. Weigh and record the weight of the material retained on the No. 8 sieve and leave this material (do not discard) on the scale or balance. Ensure that observed fabric balls remain on the scale or balance and are placed together on the side of the scale or balance to prevent the fabric balls from being covered or disturbed when placing the material from finer sieves on to the scale or balance. Add the material retained on the next finer sieve (No. 16 sieve) to the scale or balance. Weigh and record that weight as the accumulative weight retained on that sieve (No. 16 sieve). Continue weighing and recording the accumulated weights retained on the remaining sieves until the accumulated weight retained in the pan has been determined. Before discarding the crumb rubber sample, separately weigh and record the total weight of the fabric balls in the sample.
- 4. Determine the weight of material passing the No. 200 sieve (or weight retained in the pan) by subtracting the accumulated weight retained on the No. 200 sieve from the accumulated retained weight in the pan. If the material passing the No. 200 sieve (or weight retained in the pan) has a weight of 5 grams or less, cross out the recorded number for the accumulated weight retained in the pan and copy the number recorded for the accumulated weight retained on the No. 200 sieve and record that number (next to the crossed out number) as the accumulated weight retained in the pan. If the material passing the No. 200 sieve (or weight retained in the pan) has a weight greater than 5 grams, cross out the recorded number for the accumulated weight retained in the pan, subtract 5 grams from that number and record the difference next to the crossed out number. The adjustment to the accumulated with retained in the pan is made to account for the 5 grams of the talc added to the sample. For calculation purposes, the adjusted accumulated weight is the same as the adjusted accumulated weight retained in the pan. Determine the percent passing based on the adjusted total sample weight and recorded to the nearest 0.1 percent.
- **D. Report.** Report all test results on ME provided forms.

NJDOT B-12 – DETERMINING ROTATIONAL VISCOSITY OF ASPHALT RUBBER BINDER

- **A. Scope.** This method presents procedures for sampling and testing of asphalt-rubber binder in the field using a hand held portable rotational analog or digital viscometer.
- **B.** Apparatus. Use the following apparatus:
 - 1. Viscometer. A hand held high range rotational viscometer. Analog models with indicator needles and scaled dial displays or digital read out viscometers may be used. Analog models that have been found acceptable include Rion Model VT-04E and Haake Model, VT-02. Digital models that have been found acceptable include Haake VT 2 Plus.
 - **2. Rotor.** A cylinder with a diameter of 24 ± 1.1 millimeters, height of 53 ± 0.1 millimeters, and a vent hole attached to a spindle or shaft with length of 87 ± 2 millimeters that is compatible with the selected viscometer. Acceptable rotors include Rion No. 1, Haake No 1, or an equivalent.
 - **3. Thermometer.** Digital with metal jacket probe accurate to 1 °F.
 - **4. Sample Containers.** Clean 1 gallon metal cans with lids and wire bale.
 - **5. Viscosity Standard Oils.** Fluids calibrated in absolute viscosity centipoise (cP).
 - **6. Viscometer Holder.** Clean metal container or stand for safely storing the viscometer between tests.
 - 7. Level Surface. Level surface not directly on the ground.
 - **8. Heat Source.** A controllable heat source (i.e. a hot plate, gas stove, or burner) to maintain the temperature of the asphalt-rubber sample at 350 ± 3 °F while measuring viscosity.
 - **9. Personal Equipment.** Eye protection and heat resistant gloves.
- **C. Procedure.** Perform the following steps:
 - 1. Calibration of Equipment. Calibrate the equipment as follows:
 - a. Verify the accuracy of the viscometer by comparing the viscosity results obtained with the hand held viscometer to 3 separate calibration fluids of known viscosities ranging from 1000 cP to 5000 cP. The

- known viscosity value are based on the fluid manufacturer's standard test temperature or based on the test temperature versus viscosity correlation table provided by the fluid manufacturer.
- b. The viscometer is considered accurate if the values obtained are within 300 cP of the known viscosity.
- c. Verify the calibration of the rotational viscometer using viscosity standards before use at each site.
- 2. Sampling Asphalt-Rubber Binder. Provide new sample containers and ensure that they are clean before using. Before sampling, draw at least 1 gallon from an appropriate sample valve on the interaction tank and discard. Then reopen the sample valve and draw at least 3/4 of a gallon for testing.
- 3. Preparing Asphalt-Rubber Binder Samples for Testing. Prepare the asphalt-rubber binder as follows:
 - a. Immediately transport the sample to the testing area. Ensure that the testing area is close to the sampling location to reduce the potential for temperature loss.
 - b. Set the open asphalt-rubber binder sample container on the level surface on or over the heat source.
 - c. To prevent scorching or burning, manually stir the asphalt-rubber binder sample using a metal stir rod or the temperature probe.
 - d. Continue stirring until a consistent asphalt-rubber binder temperature of 350 ± 3 °F is achieved. Record the actual test temperature with the corresponding viscosity measurement.
 - e. Insert the viscometer spindle and rotor into the hot asphalt-rubber binder sample near the edge of the can. Ensure that the spindle and rotor are not inserted deeper than the immersion depth mark on the shaft and are not plugging the vent hole. During insertion, the spindle and rotor may be tilted slightly to keep the vent hole clear.
 - f. Allow the rotor to acclimate to the temperature of the asphalt-rubber binder for approximately 1 minute. During acclimation, stir the sample thoroughly and measure the temperature.
 - g. Orient the sample and the rotor so that the rotor is near the center of the sample, align the depth mark on the shaft with the asphalt-rubber binder surface, and level the viscometer in order to measure viscosity.
- **4. Testing.** Analog viscometers include a level bubble to help orient the device to ensure that the rotor and shaft remain vertical. Digital viscometers may not include a level bubble. If a level bubble is not included, attach a small adhesive bubble to the viscometer or use a framework with a level bubble.

Test the asphalt-rubber binder as follows:

- a. As soon as the viscometer is leveled and the depth mark is even with the asphalt-rubber binder surface, begin rotor rotation. When using a digital viscometer, activate the continuous digital display according to the manufacturer's recommendations. Read and record the peak viscosity value (The peak measurement typically represents the viscosity of the asphalt-rubber binder; report and log that value. As the rotor continues to turn, it "drills" into the sample and spins rubber particles out of its measurement area. This may cause thinning of the material in contact with the rotor erroneously indicating a drop in the apparent viscosity of the asphalt-rubber binder) from the graduated scale labeled with the corresponding rotor number or from the digital display.
- b. After completing the first measurement, move the viscometer rotor away from the center of the sample can without removing it from the asphalt-rubber binder sample. Turn off the rotor rotation.
- c. Stir the asphalt-rubber binder sample thoroughly.
- d. Repeat Steps 1, 2, and 3. Take 3 measurements and average the results to determine the viscosity.
- e. Return the viscometer to its holder with the rotor suspended in a suitable solvent. Before using the rotor again, wipe off the solvent and dry the rotor to avoid solvent contamination of the next sample.
- **D.** Calculations. Some meters read in units of mPa·s (0.001 Pascal·seconds) or dPa·s (0.1 Pa·s), while others may read in centipoise (cPs) units. The conversion is 1 Pa·s = 1000 cPs.
- **E. Report.** Include the following items in the report:

- 1. Date and time sampled.
- Location of asphalt-rubber binding blending plant. Test temperature and viscosity. 2.
- 3.
- Rotor designation. 4.
- Viscometer model and serial n

ATTACHMENTS

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

- General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Payment of Predetermined Minimum Wage
- V. Statements and Payrolls
- VI. Record of Materials, Supplies, and Labor
- VII. Subletting or Assigning the Contract
- VIII. Safety: Accident Prevention
- IX. False Statements Concerning Highway Projects
- X. Implementation of Clean Air Act and Federal Water Pollution Control Act
- XI. Certification Regarding Debarment, Suspension Ineligibility, and Voluntary Exclusion
- XII. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

A. Employment Preference for Appalachian Contracts (included in Appalachian contracts only)

I GENERAL

- 1. These contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.
- 2. Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.
- 3. A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.
- 4. A breach of the following clauses of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

Section I, paragraph 2;

Section IV, paragraphs 1, 2, 3, 4, and 7;

Section V, paragraphs 1 and 2a through 2g.

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the DOL, or the contractor's employees or their representatives.

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- 6. Selection of Labor: During the performance of this contract, the contractor shall not:
 - a. discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attachment A), or
 - b. employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

II. NONDISCRIMINATION

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

- 1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630 and 41 CFR 60) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:
 - a. The contractor will work with the State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.
 - b. The contractor will accept as his operating policy the following statement:
 - "It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job training."
- 2. EEO Officer: The contractor will designate and make known to the SHA contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of EEO and who must be assigned adequate authority and responsibility to do so.
- 3. **Dissemination of Policy**: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:
 - a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.
 - b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.
 - c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minority group employees.
 - d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

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- e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.
- 4. **Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minority groups in the area from which the project work force would normally be derived.
 - a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the contractor for employment consideration.
 - b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)
 - c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.
- 5. **Personnel Actions**: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:
 - a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.
 - b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.
 - c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.
 - d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of his avenues of appeal.

6. Training and Promotion:

- a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.
- b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.

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- c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.
- d. The contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.
- 7. **Unions**: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:
 - a. The contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.
 - b. The contractor will use best efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.
 - c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the SHA and shall set forth what efforts have been made to obtain such information.
 - d. In the event the union is unable to provide the contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the SHA.
- 8. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.
 - a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.
 - b. Disadvantaged business enterprises (DBE), as defined in 49 CFR 23, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of DBE construction firms from SHA personnel.
 - The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.
- 9. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the SHA and the FHWA.

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- a. The records kept by the contractor shall document the following:
 - 1. The number of minority and non-minority group members and women employed in each work classification on the project;
 - 2. The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women;
 - 3. The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and
 - 4. The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.
- b. The contractors will submit an annual report to the SHA each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data.

III. NONSEGREGATED FACILITIES

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

- a. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.
- b. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).
- c. The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of \$10,000 or more and that it will retain such certifications in its files.

IV. PAYMENT OF PREDETERMINED MINIMUM WAGE

(Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural minor collectors, which are exempt.)

1. General:

a. All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account [except such payroll deductions as are permitted by regulations (29 CFR 3) issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c)] the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determination") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates)

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conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraphs 4 and 5 of this Section IV.

- b. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed.
- All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1,
 3, and 5 are herein incorporated by reference in this contract.

2. Classification:

- a. The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.
- b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:
 - 1. the work to be performed by the additional classification requested is not performed by a classification in the wage determination;
 - 2. the additional classification is utilized in the area by the construction industry;
 - 3. the proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and
 - 4. with respect to helpers, when such a classification prevails in the area in which the work is performed.
- c. If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the DOL, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.
- d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. Said Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary

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e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

3. Payment of Fringe Benefits:

- a. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor or subcontractors, as appropriate, shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.
- b. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

4. Apprentices and Trainees (Programs of the U.S. DOL) and Helpers:

a. Apprentices:

- 1. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.
- 2. The allowable ratio of apprentices to journeyman-level employees on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate listed in the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor or subcontractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.
- 3. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator for the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.
- 4. In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.

b. Trainees:

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- 1. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the DOL, Employment and Training Administration.
- 2. The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.
- 3. Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which case such trainees shall receive the same fringe benefits as apprentices.
- 4. In the event the Employment and Training Administration withdraws approval of a training program, the contractor or subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Helpers:

Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV.2. Any worker listed on a payroll at a helper wage rate, who is not a helper under a approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

5. Apprentices and Trainees (Programs of the U.S. DOT):

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

6. Withholding:

The SHA shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, as much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the SHA contracting officer may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or quarantee of funds until such violations have ceased.

7. Overtime Requirements:

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No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

8. Violation:

Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of \$10 for each calendar day on which such employee was required or permitted to work in excess of the standard work week of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

9. Withholding for Unpaid Wages and Liquidated Damages:

The SHA shall upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 8 above.

V. STATEMENTS AND PAYROLLS

(Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

1. Compliance with Copeland Regulations (29 CFR 3):

The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

2. Payrolls and Payroll Records:

- a. Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.
- b. The payroll records shall contain the name, the social security number of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof the types described in Section 1(b)(2)(B) of the Davis Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis Bacon Act, the contractor and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or

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- subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.
- c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices, trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely all of the information required to be maintained under paragraph 2b of this Section V. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.
- d. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
 - 1. that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V and that such information is correct and complete;
 - that such laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR 3:
 - 3. that each laborer or mechanic has been paid not less that the applicable wage rate and fringe benefits or cash equivalent for the classification of worked performed, as specified in the applicable wage determination incorporated into the contract.
- e. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 2d of this Section V.
- f. The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.
- g. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the SHA, the FHWA, the DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR

- On all Federal-aid contracts on the National Highway System, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than \$1,000,000 (23 CFR 635) the contractor shall:
 - a. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds." prior to the commencement of work under this contract.

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- b. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.
- c. Furnish, upon the completion of the contract, to the SHA resident engineer on Form FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.
- 2. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

VII. SUBLETTING OR ASSIGNING THE CONTRACT

- The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the State. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635).
 - a. "Its own organization" shall be construed to include only workers employed and paid directly by the prime contractor and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor, assignee, or agent of the prime contractor.
 - b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract as a whole and in general are to be limited to minor components of the overall contract.
- 2. The contract amount upon which the requirements set forth in paragraph 1 of Section VII is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.
- 3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the SHA contracting officer determines is necessary to assure the performance of the contract.
- 4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the SHA contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the SHA has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

VIII. SAFETY: ACCIDENT PREVENTION

- 1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the SHA contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.
- 2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in

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- accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).
- Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, the following notice shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

NOTICE TO ALL PERSONNEL ENGAGED ON FEDERAL-AID HIGHWAY PROJECTS

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined not more that \$10,000 or imprisoned not more than 5 years or both."

X. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$100,000 or more.)

By submission of this bid or the execution of this contract, or subcontract, as appropriate, the bidder, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

- 1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub.L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.
- 2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.

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- 3. That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.
- 4. That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

1. Instructions for Certification - Primary Covered Transactions:

(Applicable to all Federal-aid contracts - 49 CFR 29)

- a. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.
- b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.
- c. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.
- d. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
- e. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations.
- f. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.
- g. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
- h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the

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- "Lists of Parties Excluded From Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.
- i. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- j. Except for transactions authorized under paragraph f of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Primary Covered Transactions

- The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:
 - a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
 - b. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgement rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
 - c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1b of this certification; and
 - d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
- 2. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Covered Transactions:

(Applicable to all subcontracts, purchase orders and other lower tier transactions of \$25,000 or more - 49 CFR 29)

- a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.
- b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
- c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.
- d. The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules

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- implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
- e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
- f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
- g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.
- h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions:

- 1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
- 2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

XII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

(Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 - 49 CFR 20)

- 1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:
 - a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
 - b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of

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- Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- 2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.
- 3. The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

ATTACHMENT A - EMPLOYMENT PREFERENCE FOR APPALACHIAN CONTRACTS

(APPLICABLE TO APPALACHIAN CONTRACTS ONLY.)

- 1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:
 - a. To the extent that qualified persons regularly residing in the area are not available.
 - b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.
 - c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph 1c shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph 4 below.
- 2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which he estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, he shall promptly notify the State Employment Service.
- 3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.
- 4. If, within 1 week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph 1c above.
- 5. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

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REQUIRED CONTRACT PROVISIONS, FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA-1273).

V. STATEMENTS AND PAYROLLS

2. Payrolls and Payroll Records:

THE FOLLOWING SUBPART IS CHANGED TO:

b. The payroll records shall contain the name, the last four digits of the social security number of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof the types described in Section 1(b)(2)(B) of the Davis Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis Bacon Act, the contractor and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs. Contractors or subcontractors shall maintain complete social security numbers and home addresses for employees. Government agencies are entitled to request or review all relevant payroll information, including social security numbers and addresses of employees. Contractors and subcontractors are required to provide such information upon request.

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STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)

- 1. As used in these Specifications:
 - a. Covered area means the geographical area in which the Project is located.
 - b. Director means Director, Office of Federal Contract Compliance Programs, United States Department of Labor or any person to whom the Director delegates authority.
 - c. Employer identification number means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, US Treasury Department Form 941.
 - d. Minority includes:
 - (1) Black (a person having origins in any of the black African racial groups not of Hispanic origin);
 - (2) Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race);
 - (3) Asian and Pacific Islander (a person having originals in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
 - (4) American Indian or Alaskan Native (a person having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participating or community identification).
- 2. Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
- 3. The Contractor shall implement the specific affirmative action standards provided in paragraphs 6a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction Contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.
- 4. Neither the provisions of any collective bargaining agreement nor the failure by a union with whom the Contractor has a collective bargaining agreement to refer either minorities or women shall excuse the Contractor's obligations under these Specifications, Executive Order 111246, or the regulations promulgated pursuant thereto.
- 5. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the US Department of Labor.
- 6. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

- a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The contractor shall specifically ensure that all foreman, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment with specific attention to minority or female individual working at such sites or in such facilities.
- b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
- c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred back to the Contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the Contractor may have taken.
- d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the contractor a minority person or women sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
- e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the source compiles under 6b above.
- f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
- g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news median, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
- i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

- j. Encourage present minority and female employees to recruit other minority persons and females and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.
- k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
- I. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
- m. Ensure that seniority practices, job classifications, work assignments and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
- n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
- o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction Contraction and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
- p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
- 7. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (6a through p). The efforts of a Contractor association, joint contractor union, Contractor-Community, or other similar group of which the Contractor is a member and participant may be asserted as fulfilling any one or more of its obligations under 6A through p of these Specifications provided that the Contractor actively participates in the group, make every effort to assure that the group has a positive impact on the employment of minorities and females in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work force participation, make a good faith effort to meet its individual goals and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.
- 8. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women both minority and nonminority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
- 9. The Contractor shall not use the goals or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
- 10. The Contractor shall not enter any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
- 11. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspensions, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246 as amended.
- 12. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 6 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the

- Contractor fails to comply with the requirements of the Executive Order, the implementing regulations or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
- 13. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone number, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (such as mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.
- 14. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (such as those under the Public Works Employment Act of 1977 and the community Development Block Grant Program).
- 15. Noncompliance by the Contractor with the requirements of the Affirmative Action Program for Equal Employment Opportunity may be cause for delaying or withholding monthly and final payments pending corrective and appropriate measures by the Contractor to the satisfaction of the Department.

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL OPPORTUNITY (EXECUTIVE ORDER 11246)

1. The goals for minority and female participation, in the covered area, expressed in percentage terms for the Contractor's aggregate work force in each trade, on all construction work are as shown on Page 2.

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4. (3) a, and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

- 2. The Contractor will provide the Department with written notification in triplicate within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification will list the name, address and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.
- 3. As used in this Notice and in the Contract resulting from this solicitation the covered area is the county or counties in which the Project is located.
- 4. If a project is located in more than one county, the minority work hours goal, only, will be determined by the county which serves as the primary source of hiring or, if workers are obtained almost equally from one or more counties, the single minority goal will be the average of the affected county goals.

WORK HOUR GOALS IN EACH TRADE FOR MINORITY AND FEMALE PARTICIPATION

COUNTY	MINORITY PARTICIPATION	FEMALE PARTICIPATION
	PERCENT	PERCENT
Atlantic	18.2	6.9
Bergen	15	6.9
Burlington	17.3	6.9
Camden	17.3	6.9
Cape May	14.5	6.9
Cumberland	16	6.9
Essex	17.3	6.9
Gloucester	17.3	6.9
Hudson	12.8	6.9
Hunterdon	17	6.9
Mercer	16.4	6.9
Middlesex	15	6.9
Monmouth	9.5	6.9
Morris	17.3	6.9
Ocean	17	6.9
Passaic	12.9	6.9
Salem	12.3	6.9
Somerset	17.3	6.9
Sussex	17	6.9
Union	17.3	6.9
Warren	1.6	6.9

STATE OF NEW JERSEY EQUAL EMPLOYMENT OPPORTUNITY FOR CONTRACTS FUNDED BY FHWA

The parties to this Agreement do hereby agree that the provisions of NJSA 10:2-1 through 10:2-4 and NJSA 10:5-31 et seq (PL 1975, c 127, as amended and supplemented) dealing with discrimination in employment on public contracts, and the rules and regulations promulgated pursuant thereunto, are hereby made a part of this contract and are binding upon them.

During the performance of this contract, the Contractor agrees as follows:

- a. The Contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status or sex. The Contractor will take affirmative action to ensure that such applicants are recruited and employed, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status or sex. Such action shall include but not be limited to the following: employment, upgrading, demotion, or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Division of Civil Rights/Affirmative Action setting forth provisions of this nondiscrimination clause;
- b. The Contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status or sex;
- c. The Contractor or subcontractor, where applicable, will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the Division of Civil Rights/Affirmative Action, advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The notices referred to in paragraphs a and c may be obtained from the Supervising Engineer of Construction or his representative at the preconstruction conference.

EMERGING SMALL BUSINESS ENTERPRISE UTILIZATION ATTACHMENT FHWA FUNDED CONTRACTS

I UTILIZATION OF EMERGING SMALL BUSINESS ENTERPRISE (ESBE) AS CONTRACTORS, MATERIALS SUPPLIERS AND EQUIPMENT LESSORS.

The New Jersey Department of Transportation (NJDOT) advises each contractor or subcontractor that failure to carry out the requirements set forth in this attachment shall constitute a breach of contract and, after the notification of the applicable federal agency, may result in termination of the agreement or contract by the Department or such remedy as the Department deems appropriate. Requirements set forth in this section shall also be physically included in all subcontracts in accordance with USDOT requirements.

II POLICY.

It is the policy of the NJDOT that Emerging Small Business Enterprises (ESBE), as defined in Section IV, Part B below, shall have an opportunity to participate in the performance of contracts financed in whole or in part with federal funds. In furtherance of this policy the NJDOT has established an Emerging Small Business Enterprise Program. This program is designed to promote participation and shared economic opportunity by smaller firms who qualify as ESBE's in NJDOT construction contracts and is undertaken pursuant to the authority contained in 23 CFR Part 26.

III. CONTRACTOR'S ESBE OBLIGATION.

The contractor agrees to ensure that ESBE's, as defined in Section IV, Part B below, have an equal opportunity to participate in the performance of contracts and subcontracts financed in whole or in part with federal funds. In performing work under this agreement with the NJDOT, the contractor shall take all necessary and reasonable steps in accordance with the provisions of this attachment to ensure that ESBE's have the maximum opportunity to compete for and perform contracts. The contractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of any contract obligation including, but not limited to, its performance of its obligations under this ESBE attachment.

IV. GOALS FOR THIS PROJECT.

A. This project includes a goal of awarding 16_percent of the total contract value to subcontractors, equipment lessors and/or material suppliers, which qualify as ESBE's.

- 1. Failure to meet the minimum goal placed on this project, or to provide a good faith effort to meet the minimum goal, may be grounds for rejection of the bid as being non-responsive.
- 2. As a source of information only, an ESBE Directory is available from the Division of Civil Rights/Affirmative Action. Use of this listing does not relieve the contractor of its responsibility to seek out ESBE's not listed, prior to bid. If a contractor proposes to use an ESBE contractor not listed in the ESBE Directory, the proposed ESBE firm must submit a completed certification application to the Division of Civil Rights/Affirmative Action, fifteen (15) days prior to bid date.

B. DEFINITIONS.

- Emerging Small Business Enterprise is defined as: a for-profit business concern classified as a small business pursuant to the appropriate Small Business Administration regulations, and which is owned and controlled by individuals who do not exceed the personal net worth criteria (\$750,000) established in 49 CFR Part 26.
- 2. Owned and Controlled is defined as: that at least 51% of the ownership interests as well as the management and daily business operations of the firm reside in individuals whose personal net worth does not exceed the requirements established in 49 CFR, Part 26.

V. COUNTING ESBE PARTICIPATION.

- A. Each ESBE is subject to a certification procedure to ensure its ESBE eligibility status prior to the award of contract. In order to facilitate this process it is advisable for the bidder to furnish names of proposed ESBE's to the Department 15 days before bid opening. Once a firm is determined to be a bona fide ESBE by the Division of Civil Rights/Affirmative Action, the total dollar value of the contract awarded to the ESBE is counted toward the applicable goal.
- B. The contractor may count toward its ESBE goal only expenditures to ESBE's that perform a commercially useful function in the work of a contract. An ESBE is considered to perform a commercially useful function when it is responsible for execution of a distinct element of the work of a contract and carrying out its responsibility by actually performing, managing and supervising the work involved. To determine whether an ESBE is performing a commercially useful function, the contractor shall evaluate the amount of work contracted, industry practice and other relevant factors.
- C. If a ESBE does not perform or exercise responsibility for at least 30 percent of the total cost of its contract with its own work force, or the ESBE subcontracts a greater portion of the work of a contract than would be expected on the basis of normal industry practice for the type of work involved, you must presume that it is not performing a commercially useful function.
- D. If the prime contractor is a certified ESBE, payments made to the contractor for work performed by the contractor will be applied toward the ESBE goal. Payments made to the prime contractor for work performed by non-ESBE's will not be applied toward the ESBE goal.
- E. The prime contractor may count 60 percent of its expenditures to ESBE suppliers that are not manufacturers, provided that the ESBE supplier performs a commercially useful function in the supply process. The contractor may count 100% of its expenditure to ESBE suppliers who are also manufacturers. Manufacturers receive 100% credit toward the ESBE goal.

VI GOOD FAITH EFFORT.

To demonstrate sufficient reasonable efforts to meet the ESBE contract goals, a bidder shall document the steps it has taken to obtain ESBE participation, including but not limited to the following:

- A. Attendance at a pre-bid meeting, if any, scheduled by the Department to inform ESBE's of prime contracting and subcontracting opportunities under a given solicitation.
- B. Advertisement in general circulation media, trade association publications, and small business publications for at least 20 days before bids are due. If 20 days are not available, publication for a shorter reasonable time is acceptable.
- C. Written notification to ESBE's that their interest in the contract is solicited;
- D. Efforts made to select portions of the work proposed to be performed by ESBE's in order to increase the likelihood of achieving the stated goal;
- E. Efforts made to negotiate with ESBE's for specific bids including at a minimum:
 - 1. The names, addresses and telephone numbers of ESBE's that were contacted:
 - 2. A description of the information provided to ESBE's regarding the plans and specifications for the work to be performed; and
 - 3. A statement of why additional agreements with ESBE's were not reached;
- F. Information regarding each ESBE the bidder contacted and rejected as unqualified and the reasons for the bidder's conclusion;
- G. Efforts made to assist the ESBE in obtaining bonding or insurance required by the bidder or the department.

NOTE: If the Division of Civil Rights/Affirmative Action determines that the apparent successful low bidder has failed to meet the requirements of this section, the bidder will be afforded the

opportunity for an administrative reconsideration of that determination prior to the award or rejection of the contract. As part of the administrative reconsideration process, the bidder will have the opportunity to provide written documentation or argument concerning the issue of whether it met the goal or made adequate good faith efforts to do so. NJDOT will send the bidder a written decision on reconsideration, explaining the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so. The result of the reconsideration process is not administratively appealable to the USDOT.

VII SUBMISSION OF REQUIRED DOCUMENTS.

- A. The following shall be submitted either with the bid or to the Division of Civil Rights and Affirmative Action no later than seven (7) State business days after the date of receipt of bids.
 - 1. ESBE Form "A2" Schedule of ESBE Participation. List all ESBE's participating in the contract; listing the scope of work, dollar value and percent of total contract to be performed.
 - Supplement to ESBE Form "A2"- A list of all subcontractors who submitted bids or quotes on this project.
 - ESBE Form B Affidavit of Emerging Small Business Enterprise. Each proposed ESBE not listed in the NJDOT ESBE directory must submit Form B attesting to its validity as an ESBE. (All firms must be certified by the Department's ESBE Coordinator prior to award of the contract).
 - 4. Request for Exemption In the event that the bidder fails to meet the specified goal, they must submit within Seven State business days of the bid, a written request for exemption to the goal. This request must include a written statement addressing Items A through G in Article VI of this attachment in addition to an accounting of the reason(s) why each items in the bid proposal was not subcontracted. Submittal of such request does not imply departmental approval. An assessment of the material will be conducted by the Department's Division of Civil Rights/Affirmative Action.
 - 5. The name of the person who is serving as its ESBE Liaison Officer
- B. The State Highway Engineer will be the sole judge of proper compliance and action taken in fulfilling the requirements as set forth herein.

VIII ESBE LIAISON OFFICER.

A. The contractor shall designate an ESBE Liaison Officer who shall be responsible for the administration if its ESBE program in accordance with the requirements of this attachment.

IX OBLIGATIONS AFTER AWARD OF THE CONTRACT.

If at any time following the award of contract, the contractor intends to sublet any portion(s) of the work under said contract, or intends to purchase material or lease equipment not contemplated during preparation of bids, said contractor shall take the following actions:

- 1. Notify the Resident Engineer, in writing, of the type and approximate value of the work the contractor intends to accomplish by such subcontract, purchase order or lease.
- 2. Attempt to obtain a qualified ESBE to perform the work.
- 3. Submit the Post-Award ESBE Certification Form to the Regional Supervising Engineer with his application to sublet or prior to purchasing material or leasing equipment. Post Award ESBE forms may be obtained from the Resident Engineer.

X CONSENT BY DEPARTMENT TO SUBLETTING.

The Department will not approve any subcontract proposed by the Contractor unless and until said contractor has complied with the terms of this attachment.

XI SELECTION AND RETENTION OF SUBCONTRACTORS.

- A. The contractor is further obligated to provide the Resident Engineer with a listing of firms, organizations or enterprises solicited and those utilized as subcontractors on the proposed project. Such listing shall clearly delineate which firms are classified as an ESBE.
- B. The contractor shall identify all efforts it made to identify and retain an ESBE as a substitution subcontractor when the arrangements with the original ESBE proved unsuccessful shall be submitted in writing to the Department's ESBE Coordinator for approval. Work in the category concerned shall not begin until such approval is granted in writing.
- C. Notification of a subcontractor's termination will be sent to the Department by the contractor through the Resident Engineer. Said termination notice will state whether the subcontractor is an ESBE and the reason for termination.

XII CONCILIATION.

Allegations of breach of any obligation contained in these ESBE provisions will be investigated by the Federal Office of Contract Compliance in conjunction with the Division of Civil Rights/Affirmative Action of the New Jersey Department of Transportation and the Federal Highway Administration.

XIII DOCUMENTATION.

- A. The Department or the federal funding agencies may at any time require such information as is deemed necessary in the judgement of the Department to ascertain the compliance of any bidder or contractor with the terms of these provisions.
- B. Record and Reports.

The Contractor shall keep such records as are necessary to determine compliance with its Emerging Small Business Enterprise Utilization obligations. The records kept by the contractor will be designed to indicate:

- 1. The names of ESBE contractors, equipment lessors and material suppliers contacted for work on this project.
- 2. Work, services and materials which are not performed or supplied by the prime contractor.
- 3. The actual dollar value of work subcontracted and awarded to ESBE's.
- 4. Efforts taken in seeking out and utilizing ESBE's. This would include solicitations, quotes and bids regarding project work items, supplies, leases, or other contract items.
- 5. Documentation of all correspondence, contacts, telephone calls, or other actions taken to obtain the services of ESBE's on this project.
- 6. Records of all ESBE's who have submitted quotes/bids to the contractor on the project.
- C. Submit reports, as required by the Department, on those contracts and other business transactions executed with ESBE's in such form and manner as may be prescribed by the Department.
- D. All such records must be maintained for a period of three (3) years following acceptance of final payment and will be available for inspection by the Department.

XIV PAYMENT TO SUBCONTRACTORS.

The Contractor agrees to pay its subcontractors in accordance with the Specifications

XV NON-COMPLIANCE.

Failure by the bidder to comply with these provisions may result in rejection of the bid. The contractor may further be declared ineligible for future Department contracts.

FHWA ATTACHMENT NO.6

EQUAL EMPLOYMENT OPPORTUNITY SPECIAL PROVISIONS

General

- a. Equal employment opportunity requirements not to discriminate and to take affirmative action to assure equal employment opportunity as required by Executive Order 11246 and Executive Order 11375 are set forth in Required Contract Provisions (Form FHWA-1273) and these Special Provisions which are imposed pursuant to Section 140 of Title 23 USC, as established by Section 22 of the Federal Aid Highway Act of 1968. The requirements set forth in these Special Provisions shall constitute the specific affirmative action requirements for project activities under this contract and supplement the Equal Employment Opportunity requirements set forth in the Required Contract Provisions.
- b. The Contractor will work with the State agencies and the Federal Government in carrying out Equal Employment Opportunity obligations and in their review of activities under the contract.
- c. The Contractor and all subcontractors holding subcontracts, not including material suppliers, of \$10,000 or more, will comply with the following minimum specific requirement activities of Equal Employment Opportunity. The Contractor will include these requirements in every subcontract of \$10,000 or more with such modification of language as is necessary to make them binding on the subcontractor. (The equal employment opportunity requirements of Executive Order 11246, as set forth in Volume 6, Chapter 4, Section 1, Subsection 1 of the Federal-Aid Highway Program Manual, are applicable to material suppliers as well as contractors and subcontractors).
- d. Noncompliance by the Contractor with the requirements of the Affirmative Action Program for Equal Employment Opportunity may be cause for delaying or withholding monthly and final payments pending corrective and appropriate measures by the Contractor to the satisfaction of the Department.

2. Equal Employment Opportunity Policy

The Contractor will accept as its operating policy the following statement which is designed to further the provisions of equal employment opportunity to all persons without regard to their race, color, religion, sex, or national origin, and to promote the full realization of equal employment opportunity through a positive continuing program:

It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, or national origin. Such action shall include employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and on-the-job training.

3. Equal Employment Opportunity Officer

The Contractor will designate and make known to the Department contracting officers an equal opportunity officer (hereinafter referred to as the EEO Officer) who will have the capability, authority and responsibility to effectively implement and promote an active contractor program of equal employment opportunity.

4. Dissemination of Policy

a. All members of the Contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommended such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the Contractor's equal employment opportunity policy and contractual responsibilities to provide equal employment opportunity in each grade and classification of employment. To ensure compliance, the following minimum actions will be taken:

- (1) An initial project site meeting with key supervisory and office personnel will be conducted before or at the start of work, and then not less than once every 6 months, at which time the Contractor's equal employment opportunity program will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.
- (2) All new supervisory and office personnel will be given a thorough indoctrination by the EEO Officer or other knowledgeable company official covering all major aspects of the Contractor's equal employment opportunity obligations within 30 days following their reporting for duty with the Contractor.
- (3) All personnel engaged in direct recruitment for the project will be instructed by the EEO Officer or appropriate company official concerning the Contractor's procedures for locating and hiring minority and female employees.
- b. In order to make the Contractor's equal employment opportunity policy known to all employees, prospective employees and potential sources of employees, i.e., schools, employment agencies, labor unions (where appropriate), college placement officers, etc., the Contractor will take the following actions:
 - (1) Notices and posters setting forth the Contractor's equal employment opportunity policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.
 - (2) The Contractor's equal employment opportunity policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, and/or other appropriate means.

5. Recruitment

- a. When advertising for employees, the Contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer". All such advertisements will be published in newspapers or other publications having a large circulation among minority groups in the area from which the project work force would normally be derived.
- b. The Contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority and female applicants, including, but not limited to, State employment agencies, schools, colleges and minority-oriented organizations. To meet this requirement, the Contractor will, through his EEO Officer, identify sources of potential minority and female employees, and establish procedures with such sources whereby applicants may be referred to the Contractor for employment consideration.
 - In the event the Contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the Contractor's compliance with the equal employment opportunity contract provisions. (The US Department of Labor has held that where implementation of such agreements have the effect of discriminating against minorities or females, or obligates the Contractor to do the same, such implementation violates Executive Order 11246, as amended).
- c. The Contractor will encourage his present employees to refer minority and female applicants for employment by posting appropriate notices or bulletins in areas accessible to all such employees. In addition, information and procedures pertaining to the referral of applicants will be discussed with employees.

6. Personnel Actions

Wages, working conditions and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, or national origin. The following procedures shall be followed:

a. The Contractor will conduct a project site inspection at the start of work, and periodically thereafter, to ensure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

- b. The Contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.
- c. The Contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the Contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.
- d. The Contractor will promptly investigate all complaints of alleged discrimination made to the Contractor in connection with its obligations under this contract, and will resolve or attempt to resolve such complaints, within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, corrective action shall include such other persons. Upon completion of each investigation, the Contractor will inform complainants of available avenues of appeal.

7. Training Special Provisions

As part of the Contractor's equal employment opportunity affirmative action program, training shall be provided as follows:

The Contractor shall provide on-the-job training aimed at developing full journey people in the type of craft or job classification involved.

The number of training positions will be 14, where feasible, consisting of at least 4 APPRENTICES and 10 TRAINEES. TRAINEE HOURS=9,740.

Apprentices are defined as registered members of an approved apprenticeship program recognized by the United States Department of Labor (USDOL) Bureau of Apprenticeship and Training (BAT) or a New Jersey State apprenticeship agency recognized by USDOL BAT (e.g., New Jersey Department of Education). Graduates of the Pre-Apprenticeship Training Cooperative Program shall be classified as apprentices. Trainees are defined as skilled, semi-skilled or lower level management individuals receiving training per one of the approved NJDOT "Revised Standard Training Guidelines" (available from the Division of Civil Rights).

Where feasible, at least 50% of the training positions will be assigned to Skilled Crafts which include but are not limited to Carpenters, Dockbuilders, Electricians, Ironworkers and Operating Engineers.

a. Contractor Submission and NJDOT Approval of the Initial Training Program.

At or after the preconstruction conference and prior to the start of work, the Contractor shall submit a training program to the Resident Engineer for his or her review and comments prior to Division of Civil Rights review and approval. The Contractor's training program shall include:

- (1) the number of trainees or apprentices to be trained in all selected Training Positions,
- (2) the Standard Program Hours for all positions,
- (3) an estimate of the Minimum Available Hours actually feasible on the project toward completion of the Standard Program Hours per position,
- (4) a training schedule of Estimated Start Dates for the apprentices or trainees, developed and coordinated with the project's work progress schedule,
- (5) Training Guidelines for all positions, and
- (6) which training will be provided by the Contractor and which by Subcontractors.

The number of apprentices and trainees shall be distributed among the work classifications on the basis of the Contractor's needs and the availability of journeypeople in the various crafts within a reasonable area of recruitment. The Contractor shall submit timely, revised training programs as required throughout the project to ensure that feasible and Maximum Available Training is provided. Maximum Available Training is defined as bringing each apprentice or trainee onto the project when work first becomes available in his/her craft and providing all available training until hours are no longer available.

b. Assignment of Training to Subcontractors

In the event that portions of the contract work are subcontracted, the Contractor shall determine how many, if any, of the apprentices or trainees are to be trained by subcontractors, provided,

however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by these Training Special Provisions. The Contractor shall also ensure that these Training Special Provisions are made applicable to such subcontracts.

- c. Requirements for Recruitment, Selection and Approval of Apprentices and Trainees
 - (1) Apprentices or trainees should be in their first year of apprenticeship or training. The Contractor shall interview and screen trainee candidates to determine if their actual work experience is equivalent to or exceeds that offered by the training program prior to submitting candidates, via the Resident Engineer, to the Division for review and approval or disapproval.
 - (2) Training and upgrading of minorities (e.g., Blacks, Asians or Pacific Islanders, Native Americans or Alaskan Natives, Hispanics) and females toward journeyperson status is a primary objective of these Training Special Provisions. Accordingly, the Contractor shall make every effort to enroll minorities and females, by conducting systematic and direct recruitment through public and private sources likely to yield minority and female apprentices or trainees, to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.
 - (3) No employee shall be employed as an apprentice or trainee in any position in which he or she has successfully completed a training course leading to journeyperson status or in which he or she has been employed as a journeyperson. The Contractor shall satisfy this requirement by including appropriate questions in the employment application or by other suitable means and by submitting an accurate and complete "Apprentice/Trainee Approval Memorandum." Regardless of the methods used, the Contractor's records should document the findings in each case.
 - (4) Skilled craft trainees may complete up to 3,000 total training hours on NJDOT projects, with an extension of an additional 1,000 hours permitted on a case-by-case basis. Semi-skilled and lower-level management trainees attain journeyperson status upon completion of a training guideline and may complete up to three (3) different positions.
- d. Apprenticeship and Training Programs
 - (1) The minimum length and type of training for each position will be established in the training program selected by the Contractor and approved by NJDOT and the Federal Highway Administration. NJDOT will approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the average apprentice or trainee for journeyperson status in the craft concerned by the end of the training period.
 - (2) Apprenticeship programs registered with the US Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by USDOL BAT and training programs approved but not necessarily sponsored by the US Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided such programs are being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the NJDOT Division of Civil Rights prior to commencing work on the positions covered by the Contractor's training program. The Division will review guidelines developed by the Contractor for approval or disapproval in accordance with the Training Guideline Approval Process described in the "Revised Standard Training Guidelines". The Division will also review existing guidelines for revision based on the same process.
 - (3) It is the intention of these provisions that training be provided in construction crafts rather than clerk-typist or secretarial-type positions. Training is permitted in lower level management positions (e.g., timekeepers), where the training is oriented toward project site applications. Training in semi-skilled laborer positions is permitted provided that significant and meaningful training is available on the project site. Some offsite, classroom training (e.g., safety, first aid instruction) may be permitted as long as such training is an integral part of an approved training program and does not comprise a significant part of the overall training.
- e. Reimbursement of the Contractor for Providing Training

- (1) The Contractor will be credited for each apprentice or trainee employed on the construction site who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such apprentices or trainees as provided hereinafter. Payment will be made under the pay item Trainees at the bid price in the Proposal per person-hour of training given an employee on this contract in accordance with an approved training program. If approved, payment will be made for training persons in excess of the number specified herein. This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other sources do not specifically prohibit the Contractor from receiving other reimbursement. Offsite, classroom training reimbursement may only be made to the Contractor when the company does one or more of the following and the apprentices or trainees are concurrently employed on a Federal-aid project: contributes to the cost of the training and/or provides instruction to apprentices or trainees or pays their wages during the offsite, classroom training (e.g., safety, first aid instruction) period.
- (2) The Contractor shall pay apprentices and trainees according to the project-specific New Jersey Department of Labor Prevailing Wage Rate Determination for the project.
- f. Documentation Required to be Signed by Apprentices or Trainees and provided to NJDOT
 - (1) At the start of training, the Contractor shall provide the Resident Engineer and each apprentice or trainee with an applicable "Training Guideline" and, at the conclusion of training, an accurate and complete "Training Certificate for Reporting Hours to NJDOT", showing hours of training satisfactorily completed.
 - (2) The Contractor shall maintain and submit an accurate and complete "NJDOT Contractor's 1409 Quarterly Training Report" to the Resident Engineer within ten (10) days of the end of each training quarter (e.g., January 10, April 10, July 10, October 10); a copy shall also be given to each apprentice or trainee.
 - (3) The Contractor shall maintain and submit accurate and complete "Biweekly Training Reports" to the Resident Engineer, and each apprentice or trainee, as periodic reports documenting performance under these Training Special Provisions.
- g. Training and Promotion
 - (1) The Contractor shall assist in locating, qualifying, and increasing the skills of minority and female employees, and applicants for employment.
 - (2) The Contractor shall advise employees and applicants for employment of available training programs and entrance requirements.
 - (3) The Contractor shall periodically review the training and promotion potential of minority and female employees and encourage eligible employees to apply for such training and promotion.
- h. Determining Good Faith Compliance
 - (1) Per the approved program or guideline, the Contractor shall provide Maximum Available Training to apprentices and trainees by beginning their training as soon as feasible with the start of craft work utilizing the skill involved on the project construction site and by retaining them as long as training opportunities exist in their crafts or until their training program positions are completed.
 - (2) The Contractor shall recall apprentices or trainees released due to reductions in force when the work scope permits and they are available to return. When they are unavailable to resume training on the project site, the Contractor shall submit written proof of recall efforts and replacement candidates and/or positions in a timely manner. The Contractor shall not terminate apprentices or trainees prior to completion of their training program positions without NJDOT consultation and authorization. Apprentices or trainees are not required to be on board for the entire length of the contract.
 - (3) The Contractor shall have fulfilled the contractual responsibilities under these Training Special Provisions if the company has provided Acceptable Training to the number of apprentices or trainees specified in this contract and/or by providing the remaining hours required to complete training positions begun by apprentices or trainees on other projects. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.
 - (4) The Contractor shall be responsible for demonstrating all steps that have been taken in pursuance of enrolling minorities and females in the training program positions, prior to a

- determination as to whether the Contractor is in compliance with these Training Special Provisions.
- (5) The Contractor shall submit to the Resident Engineer written training program summaries at the 50% time and/or cost stage of the contract and also prior to project completion, describing all good faith actions and particularly addressing Maximum Available Training for incomplete training positions, per the procedure found in the revised "Instructions for Implementing the Training Special Provisions".
- i. Enforcement Measures and Contractor's Rating
 - (1) Payment will not be made if either the failure to provide the required training or the failure to hire the apprentice or trainee as a journeyperson is caused by the Contractor and evidences a lack of good faith on the part of the Contractor in meeting the requirements of these Training Special Provisions.
 - (2) Per established procedures and scheduled Contract Compliance Reviews, the Contractor's performance will be rated and reviewed periodically by the Department.
 - (3) Noncompliance with these Training Special Provisions may be cause for delaying or withholding monthly and final payments, pending corrective and appropriate measures by the Contractor to the satisfaction of the Department, per Item 1d of these EEO Special Provisions.

8. Unions

If the Contractor relies in whole or in part upon unions as a source of employees, the Contractor will make maximum effort to obtain the cooperation of such unions to increase opportunities for minorities and females within the unions, and to effect such union referrals to the construction project. Actions by the Contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

- a. The Contractor will use maximum effort to develop, in cooperation with the unions, joint training programs aimed at qualifying more minorities and females for union membership and increasing their skills in order to qualify for higher paying employment.
- b. The Contractor will use maximum effort to incorporate an equal employment opportunity clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, or national origin.
- c. The Contractor will obtain information concerning the referral practices and policies of the labor unions except that to the extent such information is within the exclusive possession of the labor unions and they refuse to furnish this information to the Contractor, the Contractor shall so certify to the Department and shall set forth what efforts have been made to obtain this information.
- d. In the event the unions are unable to provide the Contractor with a reasonable flow of minority and female referrals within the time limit set forth in the collective bargaining agreement, the Contractor will through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, or national origin, making full efforts to obtain qualified and/or qualifiable minorities and females. (The US Department of Labor has held that it shall be no excuse that the union with which the Contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees). In the event the union referral practice prevents the Contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such Contractor shall immediately notify the Department.

9. Subcontracting

- a. The Contractor will use maximum effort to solicit bids from and to utilize minority subcontractors or subcontractors with meaningful minority and female representation among their employees. Contractors may use lists of minority-owned construction firms as issued by the Department.
- b. The Contractor will use maximum effort to ensure subcontractor compliance with the equal employment opportunity obligations.

10. Documents and Reports

- a. The Contractor will maintain such documents as are necessary to determine compliance with the contract's equal employment opportunity requirements. Documents will include the following:
 - (1) the number of minorities, non-minorities, and females employed in each work classification on the Project.
 - (2) the progress and efforts being made in cooperation with unions to increase employment opportunities for minorities and females (applicable only to Contractors who rely in whole or in part on unions as a source of their work force).
 - (3) the progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees, and
 - (4) the progress and efforts being made in securing the services of minority and female subcontractors or subcontractors with meaningful minority and female representation among their employees.
- b. All such documents must be retained for a period of 3 years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the Department and the Federal Highway Administration.
- c. The contractor and each subcontractor must submit monthly employment and wage data to the Department via a web based application using electronic Form CC-257R. Instructions for registering and receiving the authentication code to access the web based application can be found at:

http://www.state.nj.us/transportation/business/procurement/ConstrServ/documents/NJ StimulusReportingNotification-Contractor.pdf

Instructions on how to complete Form CC257 are provided in the web application. Submit Form CC-257R through the web based application within 10 days following the end of the reporting month. Submission of this form also satisfies the requirement of the form FHWA 1391.

All employment and wage data must be accurate and consistent with the certified payroll records. The contractor is responsible for ensuring that their subcontractors comply with these reporting requirements. Failure by the contractor to submit Monthly Employment Utilization Report may impact the contractor's pregualification rating with the Department.

EEO SPECIAL PROVISIONS Page 7 of 7

FHWA ATTACHMENT NO.7

SPECIAL CONTRACT PROVISIONS FOR INVESTIGATING, REPORTING AND RESOLVING EMPLOYMENT DISCRIMINATION AND SEXUAL HARASSMENT COMPLAINTS

The contractor hereby agrees to the following requirements in order to implement fully the nondiscrimination provisions of the Supplemental Specifications.

The Contractor agrees that in instances when it receives from any person working on the project site a verbal or written complaint of employment discrimination, prohibited under N.J.S.A. 10:5-1 et seq., 10:2-1 et seq., 42 U.S.C. 2000(d) et seq., 42 U.S.C. 2000 (e) et seq. and Executive Order 11246, it shall take the following actions:

- 1. Within one (1) working day commence an investigation of the complaint which shall include but not be limited to interviewing the complainant, the respondent, and all possible witnesses to the alleged act or acts of discrimination or sexual harassment.
- 2. Prepare and keep for its use and file a detailed written investigative report which includes the following information:
 - a) Investigatory activities and findings.
 - b) Dates and parties involved and activities involved in resolving the complaint.
 - Resolution and corrective action taken if discrimination or sexual harassment is found to have taken place.
 - d) A signed copy of resolution of complaint by complainant and contractor.

In addition to keeping in its files the above-noted detailed written investigative report, the contractor shall keep for possible future review by the Department all other records, including but not limited to, interview memos and statements.

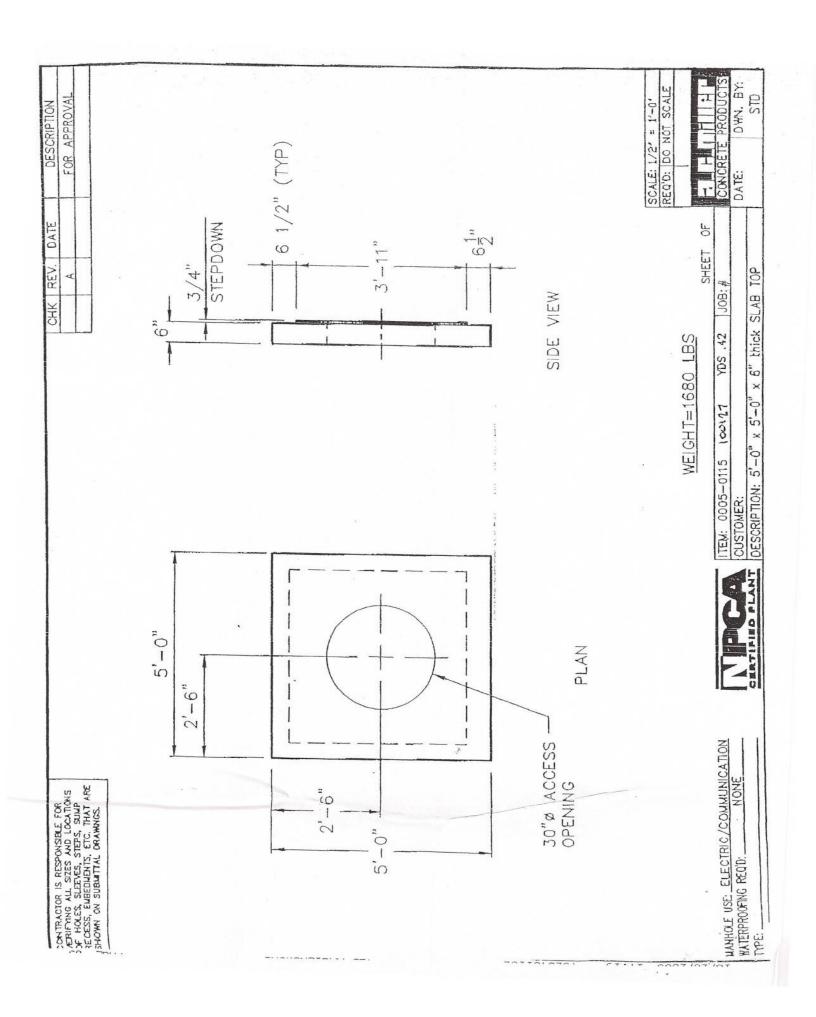
- 3. Upon the request of the Department, provides to the Department within ten (10) calendar days a copy of its detailed written investigative report and all other records on the complaint investigation and resolution.
- 4. Take appropriate disciplinary action against any contractor employee, official or agent who has committed acts of discrimination or sexual harassment against any contractor employee or person working on the project. If the person committing the discrimination is a subcontractor employee, then the contractor is required to attempt to effectuate corrective and/or disciplinary action by the subcontractor in order to establish compliance with project's contract requirements.
- 5. Take appropriate disciplinary action against any contractor employee, official or agent who retaliates, coerces or intimidates any complaint and/or person who provides information or assistance to any investigation of complaints of discrimination or sexual harassment. If the person retaliating, coercing or intimidating a complainant or other person assisting an investigation is a subcontractor's employee, then the contractor is required to attempt to effectuate corrective and/or disciplinary action by the subcontractor in order to establish compliance with the project's contract requirements.
- 6. Ensure to the maximum extent possible that the privacy interests of all persons who give confidential information in aid of the contractor's employment discrimination investigation are protected.

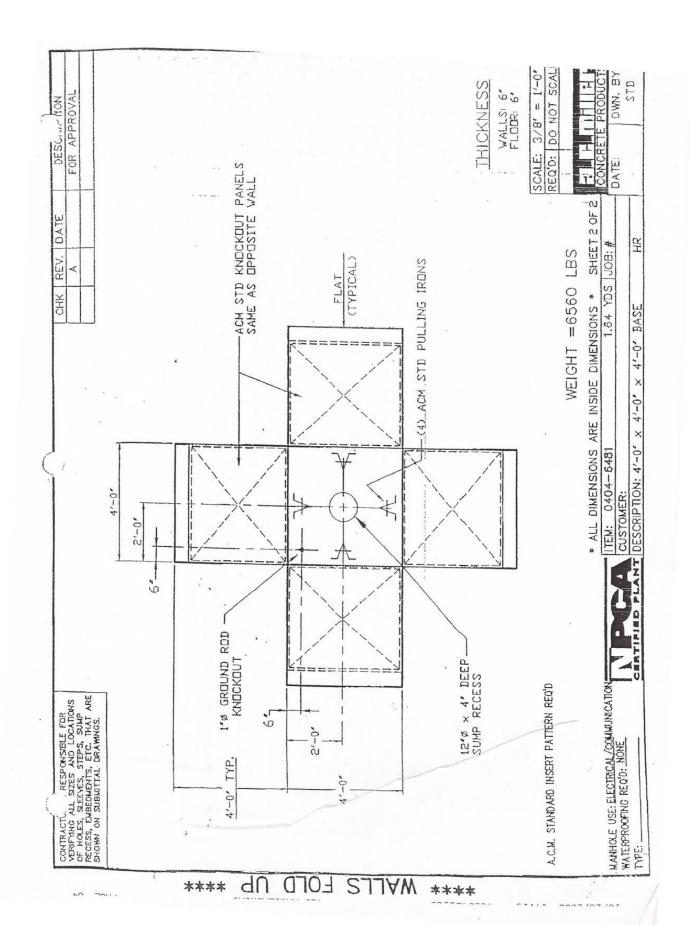
In conjunction with the above requirements, the contractor shall develop and post a written sexual harassment policy for its work force.

Failure by the contractor to comply with the above requirements may be cause for the New Jersey Department of Transportation to institute against the contractor any and all enforcement proceedings and/or sanctions authorized by the contract or by state and/or federal law.

Attachment A

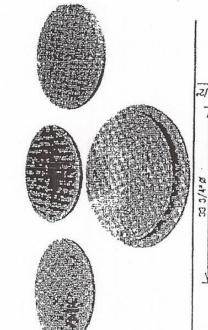
Cablevision Details





HEAVY DUTY MANHOLE FRAME & SOLID LID

MHR 431-4



ASTM A48, Class 30B. Other grades of gray iron available upon request. Suitable MHR 431-4 - Heavy duty manhole frame and cover. Gray iron meets or exceeds for H-20 loading. Finish is uncoated. Provided with 2 non-penetrating pickholes unless otherwise requested.

Quantity [Options include:

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Lettering Set-up []

6 Bolts []

4 Bolt (d) Flat Rubber (1)

With I (one) Penthead Wrenchs[] With I (one) Large "T" Key Wrench []

2 Bolt [] Hex Head S.S. Bolt [] 1/4" "O" Ring []

Gasketing Bolting

Locking

Penthead S.S. Bolt [McGard Intimidator Man-Lock Bolt [2 Drop Type [. Recessed Square [

Lift Handles

Cleated [XX] Vented [

Anchor Bolt Holes

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32 1/4" Ø - GRATE 32 1/4" Ø - COVERS

11/5.

.7/1 1

Grated Cover [] Diamond /

2 Cast-In []

7. 3/4" Diameter Vent Holes Frith /

30 1/40 38 3/8 8

MARCNE ASSOCIATES, LTD. "Sending the Construction Industry"
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P.O. Box 743, Frazer, PA 18356-0805 (510) 647-3480 D FAX (310) 647-9030

MANUFACTURED BY: E.A. Quirin Foundry, Inc., Saint Clair, PA

DATE:

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HEAVY DUTY MANH FRAME & SOLID

(SHIPPED LOOSE)



EA SIZE 30 4" QTY

- MATERIAL = ASTM A-48, CLASS 30 DESIGNED FOR H-20 LOADING
- FLUSH CLEATED LID DESIGN, MACHINED
 - (2) CONCEALED PICKHOLES
- LETTERS 2" HIGH (4) ANCHOR BOLT HOLES IN BASE FLANGE
 - 1) COAT OF BLACK ASPHALTUM

MANUFACTURED BY: WASHINGTON STREET BRASS & IRON FOUNDRY, INC. LEBANON, PA

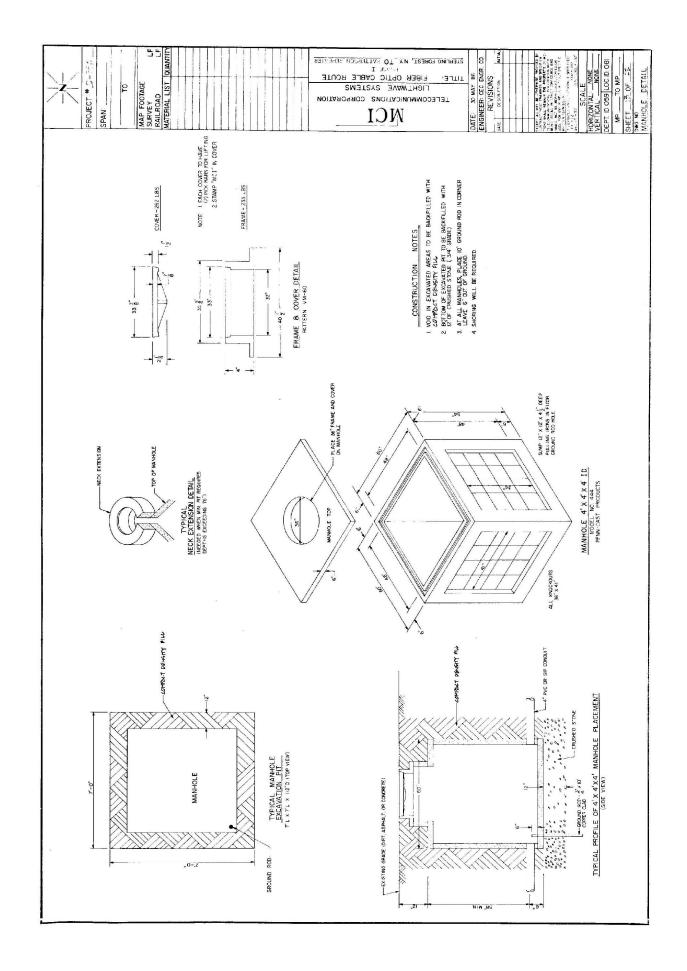
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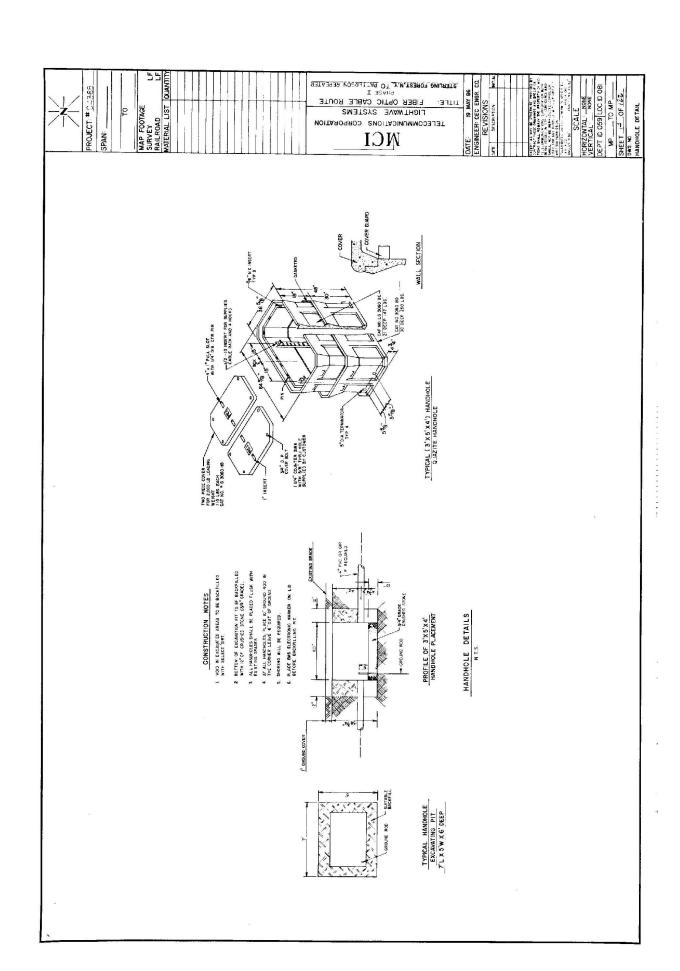
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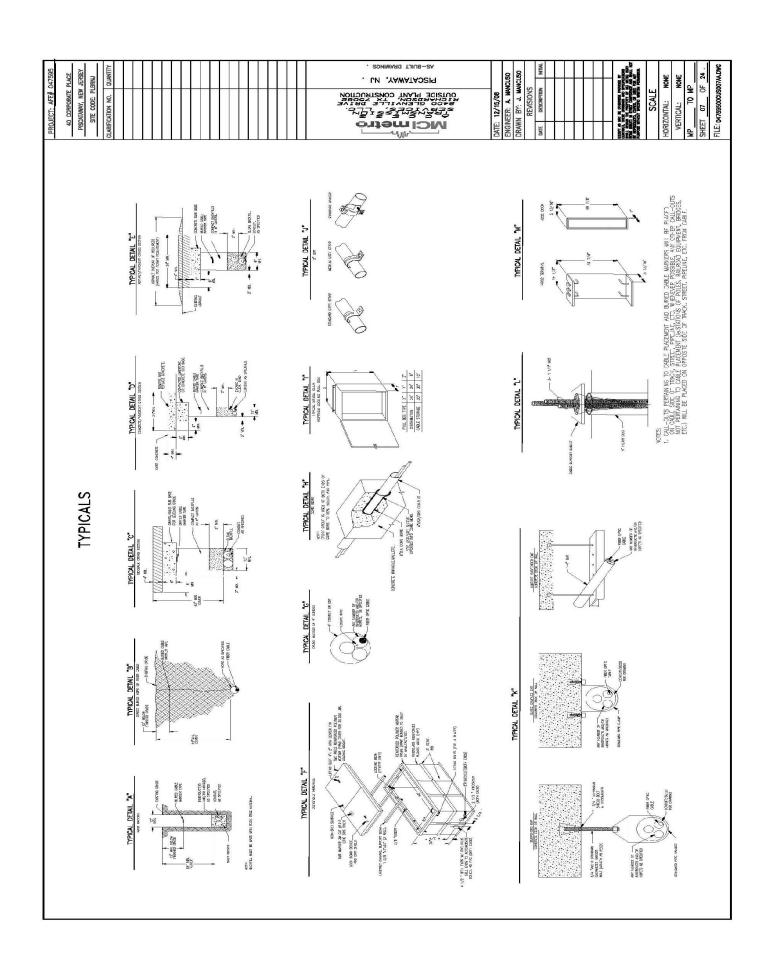
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ASS &			ITEM:	CISTO AFR.	- NOIE GIGORIA

Attachment B

Verizon Business Solutions (MCI) Fiber Manhole Details







Attachment C

PSE&G Details

(Details to be provided by the company)

Attachment D

Abovenet Details

(Details to be provided by the company)

Attachment E

Asbestos Removal Requirements